Maintenance & Service Guide

HP Compaq Elite 8300 Touch All-in-One Business PC
HP Compaq Elite 8300 All-in-One Business PC
HP Compaq Pro 6300 All-in-One Business PC

© Copyright 2012 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice.

Microsoft and Windows are trademarks of Microsoft Corporation in the U.S. and other countries.

The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

This document contains proprietary information that is protected by copyright. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Hewlett-Packard Company.

Maintenance & Service Guide

Third Edition (December 2012)

First Edition (August 2012)

Document Part Number: 701463-003

About This Book

WARNING! Text set off in this manner indicates that failure to follow directions could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

NOTE: Text set off in this manner provides important supplemental information.

Table of contents

1 Product Features 1
Overview 1
Front components 3
Side components 4
Rear components 5
Adjusting the tilt/swivel base 6
Height adjustable/recline stand (optional) 7

2 Activating and Customizing the Software 9
Activating and customizing the software in Windows 7 9
Activating the Windows operating system 9
Downloading Windows 7 updates 10
Installing or upgrading device drivers 10
Customizing the monitor display 10
Activating and customizing the software in Windows 8 10
Activating the Windows Operating System 10
Downloading Windows 8 updates 11
Customizing the monitor display 11

3 Computer Setup (F10) Utility 12
Computer Setup (F10) Utilities 12
Using Computer Setup (F10) Utilities 13
Computer Setup—File 14
Computer Setup—Storage 15
Computer Setup—Security 18
Computer Setup—Power 23
Computer Setup—Advanced 24
Recovering the Configuration Settings 26

4 HP PC Hardware Diagnostics 27
Why run HP PC Hardware Diagnostics – UEFI 27

How to access and run HP PC Hardware Diagnostics - UEFI 27
Downloading HP PC Hardware Diagnostics to a USB device 28

5 Serial ATA (SATA) Drive Guidelines and Features 29
SATA Hard Drives 29
SATA Hard Drive Cables 29
SATA Data Cable 29
SMART ATA Drives 30

6 Routine Care and Disassembly Preparation 31
Electrostatic discharge information 32
Generating static 32
Preventing electrostatic damage to equipment 32
Personal grounding methods and equipment 33
Grounding the work area 33
Recommended materials and equipment 33
Operating Guidelines 34
Routine Care 35
General cleaning safety precautions 35
Cleaning the computer case 35
Cleaning the keyboard 35
Cleaning the display 36
Cleaning the mouse 36
Service Considerations 36
Tools and software requirements 36
Screws 36
Cables and connectors 37
Hard drives 37
Lithium coin cell battery 37

7 Removal and Replacement Procedures All-in One (AIO) Chassis 38
Preparing to disassemble the computer 38
Removing the rear port cover 39
Cable management cover 39
Installing an access panel security screw 40
Synchronizing the optional wireless keyboard or mouse 40
Access panel 42
Stand 44
Lower panel 46
Metal plate 47

Replacing drives 49
Replacing the hard disc drive with a 3.5-inch hard disc drive or a single 2.5-inch drive 49
Replacing the optical disc drive 53
Memory 56
Replacing the battery 59
Serial port 61
Webcam module 63
Converter board 66
Touch sensor board 69
Heat sinks – Graphics board and processor 71
Graphics heat sink 71
Processor heat sink – model 6300 72
Processor heat sink – model 8300 73
Processor 75
mSATA Solid-State Drive 76
WLAN module 77
Graphics board 80
Speakers 82
Fan 83
Side panels 84
Power supply 86
System board 89
Card reader board 95
Power button board 97
Front bezel 100
Antenna 103
Display panel 105
Hood sensor 111
Hard drive and optical drive cables and connectors 113

8 Troubleshooting Without Diagnostics 115
Safety and Comfort 115
Before You Call for Technical Support 115
Helpful Hints 116
Solving General Problems 118
Solving Power Problems 122
Solving Hard Drive Problems 124
Solving Media Card Reader Problems 127
Solving Display Problems 129
Solving Audio Problems 134
Solving Printer Problems 136

Solving Keyboard and Mouse Problems 138
Solving Hardware Installation Problems 140
Solving Network Problems 142
Solving Memory Problems 145
Solving Processor Problems 147
Solving CD-ROM and DVD Problems 147
Solving USB Flash Drive Problems 149
Solving Front Panel Component Problems 151
Solving Internet Access Problems 151
Solving Software Problems 153
Contacting Customer Support 155

9 Backup and Recovery 156
Restoring and recovering in Windows 7 156
System Restore 156
System Recovery 156
System Recovery when Windows is responding 157
System Recovery when Windows is not responding 158
System recovery using recovery media 158
Creating recovery media 159
Using recovery media 160
Backup and recovery in Windows 8 161
Backing up your information 161
Performing a system recovery 162
Using the Windows recovery tools 162
Using f11 recovery tools 163
Using Windows 8 operating system media (purchased separately) 163

10 POST Error Messages 164
POST Numeric Codes and Text Messages 165
Interpreting POST diagnostic front panel LEDs 173

11 Password Security and Resetting CMOS 176
Establishing a Setup or Power-on password 177
Resetting the Setup and Power-on password 178
Clearing and resetting the CMOS 179

Appendix A Power Cord Set Requirements 181
General requirements 181
Japanese Power Cord Requirements 181

Country-specific requirements 182

Appendix B Specifications 183

8300 models 183

6300 models 184

Index 185

1 Product Features

Overview

Figure 1-1 HP Compaq All-in-One Business PC (model 8300 shown)

The HP Compaq All-in-One Business PC offers the following features:

- Integrated All-in-One form factor
- Full HD, LCD display (1920 x 1080) with LED backlighting
  - 23-inch diagonal with optical touch
  - 23-inch diagonal
  - 21.5-inch diagonal
- Swivel pad under base of stand
- Adjustable tilt
- Optional height adjustable and reclining stand
- Removable panel on the back of the computer allows users or technicians to easily and efficiently service the PC
- VESA mounting holes (100 mm x 100 mm)
- 2nd and 3rd generation Intel® Core™ processors
- Up to 2 TB hard disc drive, or up to 300 GB Solid State Drive

- Optional Tray-load HP SuperMulti DVD+/-RW SATA Optical Disc Drive or DVD-ROM disc drive
- Optional mSATA module that can be used as a cache or SSD for the Elite 8300 or as a second drive for the Pro 6300
- Intel Q77 Express chipset – Intel vPro (HP Compaq Elite 8300 All-in-One Business PC)
- Intel Q75 Express chipset (HP Compaq Pro 6300 All-in-One Business PC)
- Two SODIMM slots with up to 16 GB of DDR3 SDRAM memory and dual channel memory support
- Intel integrated graphics
- DisplayPort video out (with audio) for second display support
- Optional MXM graphics card
- DP audio, DP to VGA/DVI/HDMI dongle support
- Integrated Gigabit Ethernet (Intel 82579 LM Gigabit Network Connection)
- Wireless connectivity (optional):
  - Integrated 802.11 a/b/g/n or b/g/n wireless LAN module
  - Bluetooth® 4.0
- Optional integrated full HD webcam and dual microphone array
- Premium stereo speakers
- Optional 6-in-1 media card reader
- 6 USB ports: 4 USB 3.0, 2 USB 2.0
- Choice of wired or wireless keyboard and mouse
  - Wired USB keyboard and mouse
  - Wired PS/2 keyboard and mouse
  - Wireless keyboard and mouse
- Face Recognition for HP ProtectTools software with facial recognition auto-login capabilities (with optional webcam)
- Windows® 7 Professional 32-bit or 64-bit operating system
- 90-percent energy-efficient power supply
- ENERGY STAR® qualified, EPEAT® Gold registered

Front components

NOTE: Front components are the same for 6300 and 8300 models.

Figure 1-2 Front components

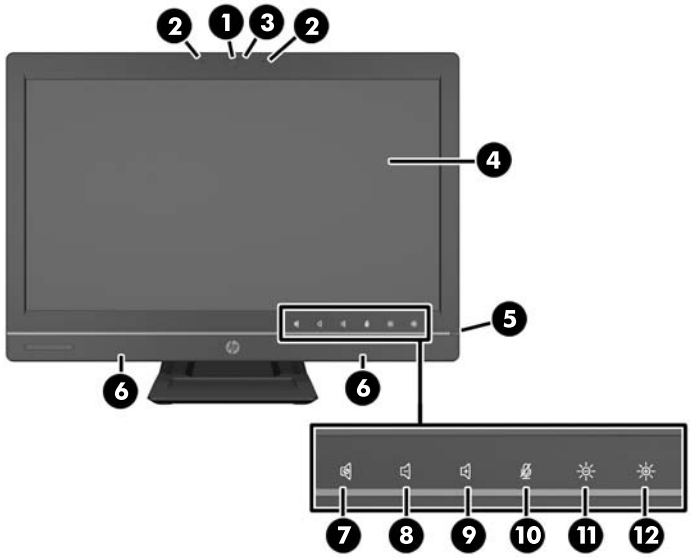


Table 1-1 Front components

Component		Component	
1	Webcam with privacy shutter (optional)	7	Mute speaker
2	Dual microphone array (with optional webcam)	8	Reduce volume
3	Webcam activity LED (with optional webcam)	9	Increase volume
4	16:9 widescreen LED-backlit LCD display	10	Mute microphone
5	Power LED	11	Decrease brightness
6	High-performance stereo speakers **NOTE:** No speaker option available.	12	Increase brightness

NOTE: To wake touch panel equipped systems from Stand by, swipe the screen or touch the screen and hold for at least one second.

To wake the systems from Hibernate, press the power button and release.

Touch the icon area (7–12 above) to cause the icons to illuminate, then touch an icon to activate it.

To change the volume or brightness, touch and hold the appropriate icon or touch it and repeat until the volume or brightness has reached the desired level.

To mute the speaker or microphone, just touch the appropriate icon. The icon remains illuminated until you touch it again to reactivate the speaker or microphone.

NOTE: If you mute or reactivate the speaker in a software application, the icon illuminates or darkens accordingly.

You cannot mute or reactivate the microphone from a software application.

Side components

NOTE: Side components are the same for 6300 and 8300 models.

Figure 1-3 Side components

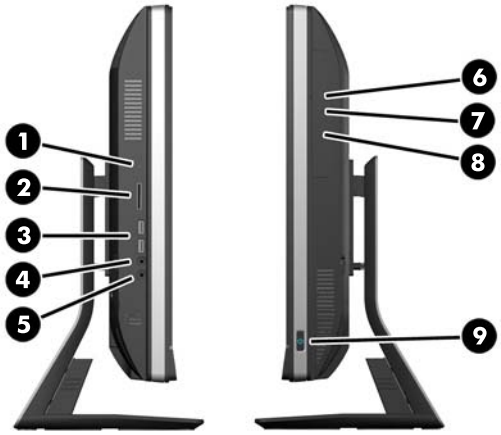


Table 1-2 Side components

Component		Component	
1	Hard disc drive activity LED	6	Tray-load optical disc drive
2	HP 6-in-1 media card reader (optional)	7	Optical disc drive eject button
3	(2) USB 3.0 ports	8	Optical disc drive activity LED
4	Microphone/line in jack	9	Power button
5	Headset/line out jack		

Rear components

NOTE: Rear components are the same for 6300 and 8300 models.

Figure 1-4 Rear components

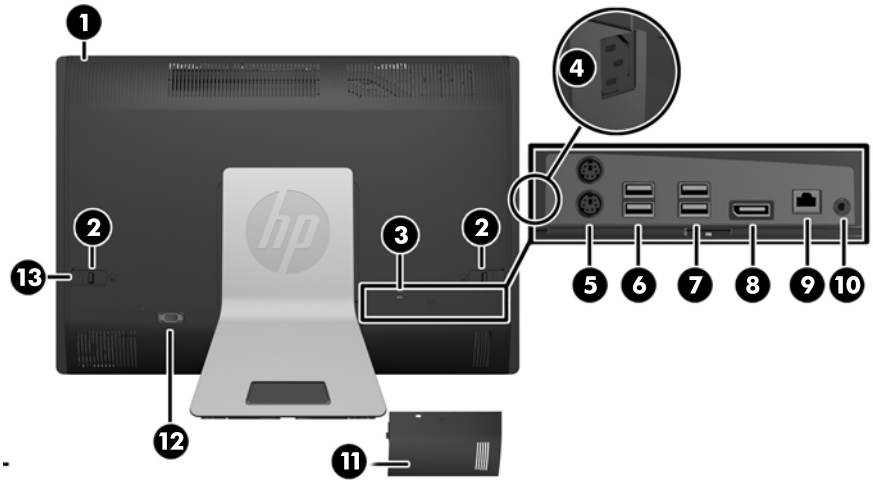


Table 1-3 Rear components

Component		Component	
1	Access panel	8	DisplayPort connector
2	Access panel latches	9	RJ-45 Gigabit Ethernet port
3	Security lock slot	10	Stereo audio line out
4	Power connector	11	Rear port cover
5	(2) PS/2 mouse and keyboard connectors	12	Serial port (optional)
6	(2) USB 2.0 ports	13	Access panel security screw
7	(2) USB 3.0 ports		

Adjusting the tilt/swivel base

Tilt the computer forward up to -5 degrees or backward up to +30 degrees to set it to a comfortable eye level.

Figure 1-5 Adjusting tilt

The tilt/swivel base has a swivel pad on the underside that allows you to swivel the computer up to 360 degrees left or right for the best viewing angle.

Figure 1-6 Adjusting swivel

Height adjustable/recline stand (optional)

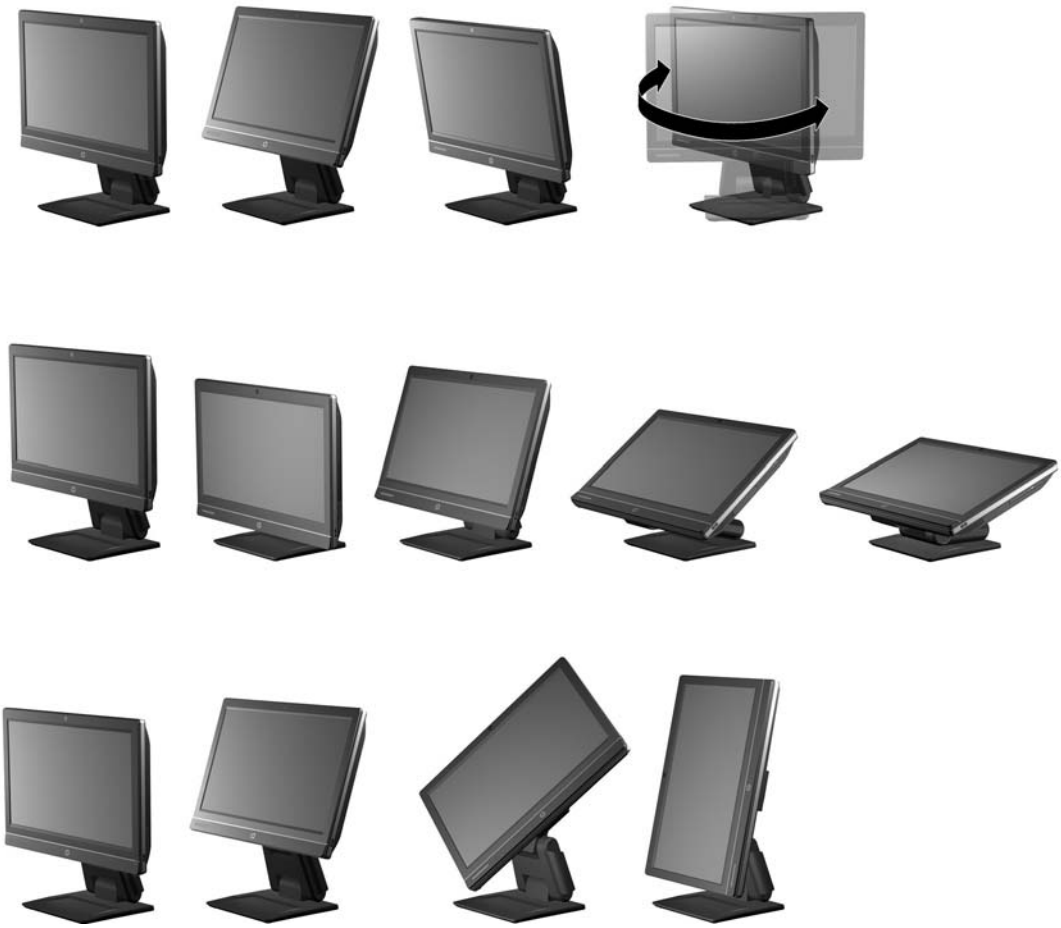
An optional stand may be purchased to allow

- height adjustment of 110 mm (4.3 inches)
- rotation from landscape to portrait position
- tilt backward up to +60 degrees
- recline to 30 degrees from the desktop

⚠ **WARNING!** If the height adjustable/recline stand is installed, before laying the computer down for service, position the computer vertically by grasping the sides of the display, and then raise the display to the highest position.

Do not lay the computer down with the sliding stand in the low position. The stand may suddenly release which could cause damage to equipment or injury.

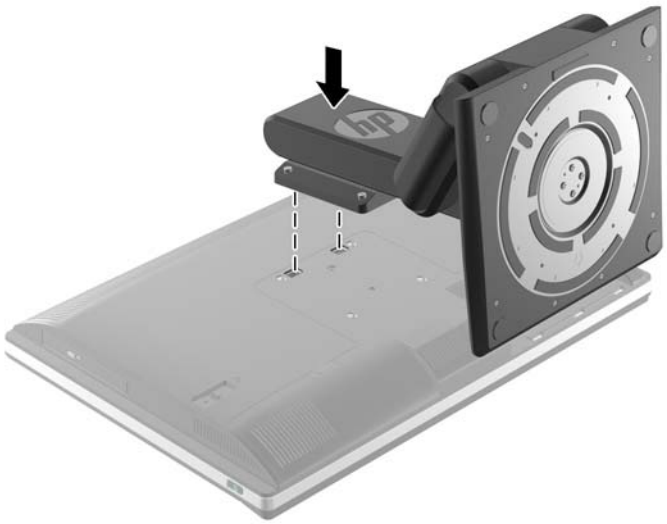
Figure 1-7 Height adjustable stand position options



To install the height adjustable stand:

1. Insert the stand into the slots in the rear of the computer.

Figure 1-8 Installing the height adjustable stand



2. Install the screws that secure the stand to the computer.

Figure 1-9 Installing the height adjustable stand screws

2 Activating and Customizing the Software

NOTE: This chapter provides information for both Windows 7 and Windows 8.

Activating and customizing the software in Windows 7

If your computer was not shipped with a Windows® operating system, some portions of this documentation do not apply. Additional information is available in online help after you activate the operating system.

CAUTION: Do not add optional hardware or third-party devices to the computer until the operating system is successfully activated. Doing so may cause errors and prevent the operating system from installing properly.

NOTE: Be sure there is a 10.2 cm (4 inch) clearance at the back of the unit and above the monitor to permit the required airflow.

Activating the Windows operating system

The first time you turn on the computer, the operating system is set up and activated automatically. This process takes about 5 to 10 minutes. Carefully read and follow the instructions on the screen to complete the activation.

We recommend that you register your computer with HP during operating system setup so you can receive important software updates, facilitate support questions, and sign up for special offers.

CAUTION: After the activation process has begun, DO NOT TURN OFF THE COMPUTER UNTIL THE PROCESS IS COMPLETE. Turning off the computer during the activation process may damage the software that runs the computer or prevent its proper installation.

NOTE: If the computer shipped with more than one operating system language on the hard drive, the activation process could take up to 60 minutes.

Downloading Windows 7 updates

Microsoft may release updates to the operating system. To help keep the computer running optimally, HP recommends checking for the latest updates during the initial installation and periodically throughout the life of the computer.

1. To set up your Internet connection, click **Start** > **Internet Explorer** and follow the instructions on the screen.
2. After an Internet connection has been established, click the **Start > All Programs > Windows Update**.
3. Run Windows Update monthly thereafter.

Installing or upgrading device drivers

When installing optional hardware devices after the operating system installation is complete, you must also install the drivers for each of the devices.

In Windows 7, if prompted for the i386 directory, replace the path specification with `C:\i386`, or use the **Browse** button in the dialog box to locate the i386 folder. This action points the operating system to the appropriate drivers.

Obtain the latest support software, including support software for the operating system, from http://www.hp.com/support. Select your country and language, select **Download drivers and software (and firmware)**, enter the model number of the computer, and press Enter.

Customizing the monitor display

If you wish, you can select or change the monitor refresh rates, screen resolution, color settings, font sizes, and power management settings.

For more information, refer to the online documentation provided with the graphics controller utility or the documentation that came with your monitor.

Right-click on the Windows desktop, then click **Personalize** to change display settings.

Activating and customizing the software in Windows 8

Additional information is available in online help after you activate the operating system.

NOTE: Be sure there is a 10.2 cm (4 inch) clearance at the back of the unit and above the monitor to permit the required airflow.

Activating the Windows Operating System

The first time you turn on the computer, the operating system is set up and activated automatically. This process takes about 5 to 10 minutes. Carefully read and follow the instructions on the screen to complete the activation.

We recommend that you register your computer with HP during operating system set up so you can receive important software updates, facilitate support questions, and sign up for special offers. You can also register your computer with HP using the **Register with HP** app on the Start screen.

⚠ **CAUTION:** After the activation process has begun, DO NOT TURN OFF THE COMPUTER UNTIL THE PROCESS IS COMPLETE. Turning off the computer during the activation process may damage the software that runs the computer or prevent its proper installation.

Downloading Windows 8 updates

Microsoft may release updates to the operating system. To help keep the computer running optimally, HP recommends checking for the latest updates during the initial installation and periodically throughout the life of the computer.

Run Windows Update as soon as possible after you set up your computer.

1. Point to the upper-right or lower-right corner of the Start screen to display the charms.
2. Click **Settings > Change PC Settings > Windows Update**.
3. Run Windows Update monthly thereafter.

Customizing the monitor display

You can customize display settings for Windows 8 separately for the Start screen and the Desktop.

To customize the Start screen:

1. Point to the upper-right or lower-right corner of the Start screen to display the charms.
2. Click **Settings** > **Change PC Settings**.
3. Click **Personalize** to change the display settings.

To customize the Desktop:

1. Click the Desktop app on the Start screen.
2. Right-click on the desktop, and then click **Personalize** to change display settings.

3 Computer Setup (F10) Utility

Computer Setup (F10) Utilities

Use Computer Setup (F10) Utility to do the following:

- Change factory default settings.
- Set the system date and time.
- Set, view, change, or verify the system configuration, including settings for processor, graphics, memory, audio, storage, communications, and input devices.
- Modify the boot order of bootable devices such as hard drives, optical drives, or USB flash media devices.
- Enable Quick Boot, which is faster than Full Boot but does not run all of the diagnostic tests run during a Full Boot. You can set the system to:
  - ❏ always Quick Boot (default);
  - ❏ periodically Full Boot (from every 1 to 30 days); or
  - ❏ always Full Boot.
- Select Post Messages Enabled or Disabled to change the display status of Power-On Self-Test (POST) messages. Post Messages Disabled suppresses most POST messages, such as memory count, product name, and other non-error text messages. If a POST error occurs, the error is displayed regardless of the mode selected. To manually switch to Post Messages Enabled during POST, press any key (except F1 through F12).
- Establish an Ownership Tag, the text of which is displayed each time the system is turned on or restarted.
- Enter the Asset Tag or property identification number assigned by the company to this computer.
- Enable the power-on password prompt during system restarts (warm boots) as well as during power-on.
- Establish a setup password that controls access to the Computer Setup (F10) Utility and the settings described in this section.
- Secure integrated I/O functionality, including the serial, USB, or parallel ports, audio, or embedded NIC, so that they cannot be used until they are unsecured.
- Enable or disable removable media boot ability.

- Solve system configuration errors detected but not automatically fixed during the Power-On Self-Test (POST).
- Replicate the system setup by saving system configuration information on a USB device and restoring it on one or more computers.
- Execute self-tests on a specified ATA hard drive (when supported by drive).
- Enable or disable DriveLock security (when supported by drive).

Using Computer Setup (F10) Utilities

Computer Setup can be accessed only by turning the computer on or restarting the system. To access the Computer Setup Utilities menu, complete the following steps:

1. Turn on or restart the computer.
2. Repeatedly press F10 when the monitor light turns green to access the utility.

   You can also press Esc to a menu that allows you to access different options available at startup, including the Computer Setup utility.

   NOTE: If you do not press F10 at the appropriate time, you must restart the computer and again repeatedly press F10 when the monitor light turns green to access the utility.
3. A choice of five headings appears in the Computer Setup Utilities menu: File, Storage, Security, Power, and Advanced.
4. Use the arrow (left and right) keys to select the appropriate heading. Use the arrow (up and down) keys to select the option you want, then press Enter. To return to the Computer Setup Utilities menu, press Esc.
5. To apply and save changes, select **File** > **Save Changes and Exit**.
   - If you have made changes that you do not want applied, select **Ignore Changes and Exit**.
   - To reset to factory settings or previously saved default settings (some models), select **Apply Defaults and Exit**. This option will restore the original factory system defaults.

   NOTE: Not all settings shown in the following sections are available for all models

CAUTION: Do NOT turn the computer power OFF while the BIOS is saving the Computer Setup (F10) changes because the CMOS could become corrupted. It is safe to turn off the computer only after exiting the F10 Setup screen.

Table 3-1 Computer Setup (F10) Utility

Heading	Table
File	Computer Setup—File on page 14
Storage	Computer Setup—Storage on page 15
Security	Computer Setup—Security on page 18
Power	Computer Setup—Power on page 23
Advanced	Computer Setup—Advanced on page 24

Computer Setup—File

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 3-2 Computer Setup—File

Option	Description
System Information	Lists: • Product name • SKU number • Processor type/speed/stepping • Cache size (L1/L2/L3) (dual core processors have this listed twice) • Installed memory size/speed, number of channels (single or dual) (if applicable) • Integrated MAC address for embedded, enabled NIC (if applicable) • System BIOS (includes family name and version) • Chassis serial number • Asset tracking number • ME firmware version • ME Management mode
About	Displays copyright notice.
Set Time and Date	Allows you to set system time and date.
Flash System ROM	Allows you to update the system ROM with a BIOS image file located on removable media.
Replicated Setup	**Save to Removable Media** Saves system configuration to a formatted USB flash media device. **Restore from Removable Media** Restores system configuration from a USB flash media device.
Default Setup	**Save Current Settings as Default** Saves the current system configuration settings as the default. **Restore Factory Settings as Default** Restores the factory system configuration settings as the default.
Apply Defaults and Exit	Applies the currently selected default settings and clears any established passwords.
Ignore Changes and Exit	Exits Computer Setup without applying or saving any changes.
Save Changes and Exit	Saves changes to system configuration or default settings and exits Computer Setup.

Computer Setup—Storage

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 3-3 Computer Setup—Storage

Option	Description
Device Configuration	Lists all installed BIOS-controlled storage devices. When a device is selected, detailed information and options are displayed. The following options may be presented: • **Hard Disk**: Size, model, firmware version, serial number, connector color. **Translation mode** (ATA disks only) Lets you select the translation mode to be used for the device. This enables the BIOS to access disks partitioned and formatted on other systems and may be necessary for users of older versions of UNIX (e.g., SCO UNIX version 3.2). Options are Automatic, Bit-Shift, LBA Assisted, User, and Off. Available only when the drive translation mode is set to User, allows you to specify the parameters (logical cylinders, heads, and sectors per track) used by the BIOS to translate disk I/O requests (from the operating system or an application) into terms the hard drive can accept. Logical cylinders may not exceed 1024. The number of heads may not exceed 256. The number of sectors per track may not exceed 63. **CAUTION:** Ordinarily, the translation mode selected automatically by the BIOS should not be changed. If the selected translation mode is not compatible with the translation mode that was active when the disk was partitioned and formatted, the data on the disk will be inaccessible. • **CD-ROM**: Model, firmware version, serial number, connector color (not included for USB CD-ROM). • **SSD Life Used** **NOTE:** Displays for solid-state drives. • **SMART** (ATA disks only) • **Diskette**: Model and firmware version. **NOTE:** Displays for USB diskette drives. • **Default Values** *(ATA disks only)* See Translation Mode above for details. **SATA Defaults**

Table 3-3 Computer Setup—Storage (continued)

Storage Options	**eSATA Port** Allows you to set a SATA port as an eSATA port for use with an external drive. Default is enabled. This setting affects only the port with the black connector, labeled as eSATA on the system board. This port should have the eSATA back panel connector attached to use eSATA drives. For more information, see the eSATA white paper at www.hp.com. **SATA Emulation** Allows you to choose how the SATA controller and devices are accessed by the operating system. There are three supported options: IDE, RAID, and AHCI (default). **CAUTION:** SATA emulation changes may prevent access to existing hard drive data and degrade or corrupt established volumes. IDE - This is the most backwards-compatible setting of the three options. Operating systems usually do not require additional driver support in IDE mode. RAID - Allows DOS and boot access to RAID volumes. Use this mode with the RAID device driver loaded in the operating system to take advantage of RAID features. AHCI (default option) - Allows operating systems with AHCI device drivers loaded to take advantage of more advanced features of the SATA controller. **NOTE:** The RAID/AHCI device driver must be installed prior to attempting to boot from a RAID/AHCI volume. If you attempt to boot from a RAID/AHCI volume without the required device driver installed, the system will crash (blue screen). RAID volumes may become corrupted if they are booted to after disabling RAID. **Removable Media Boot** Enables/disables ability to boot the system from removable media. Default is enabled. **Max eSATA Speed** Allows you to choose 1.5 Gbps or 3.0 Gpbs as the maximum eSATA speed. By default, the speed is limited to 1.5 Gbps for maximum reliability. **CAUTION:** Consult your eSATA drive and cable manufacturer before enabling 3.0 Gpbs speed. Some drive and cable combinations may not run reliably at 3.0 Gpbs.

Table 3-3 Computer Setup—Storage (continued)

DPS Self-Test	Allows you to execute self-tests on ATA hard drives capable of performing the Drive Protection System (DPS) self-tests. **NOTE:** This selection will only appear when at least one drive capable of performing the DPS self-tests is attached to the system.
Boot Order	Allows you to: • **EFI Boot Sources:** Specify the order in which EFI boot sources (such as a internal hard drive, USB hard drive, USB optical drive, or internal optical drive) are checked for a bootable operating system image. Each device on the list may be individually excluded from or included for consideration as a bootable operating system source. EFI boot sources always have precedence over legacy boot sources. • **Legacy Boot Sources:** Specify the order in which legacy boot sources (such as a network interface card, internal hard drive, USB optical drive, or internal optical drive) are checked for a bootable operating system image. Each device on the list may be individually excluded from or included for consideration as a bootable operating system source. Specify the order of attached hard drives. The first hard drive in the order will have priority in the boot sequence and will be recognized as drive C (if any devices are attached). **NOTE:** To drag a device to a preferred place, press Enter. To remove the device from consideration as a bootable device, press F5. You can use F5 to disable individual boot items, as well as disable EFI boot and/or legacy boot. **NOTE:** MS-DOS drive lettering assignments may not apply after a non-MS-DOS operating system has started. **Shortcut to Temporarily Override Boot Order** To boot **one time** from a device other than the default device specified in Boot Order, restart the computer and press Esc (to access the boot menu) and then F9 (Boot Order), or only F9 (skipping the boot menu) when the monitor light turns green. After POST is completed, a list of bootable devices is displayed. Use the arrow keys to select the preferred bootable device and press Enter. The computer then boots from the selected non-default device for this one time.

Computer Setup—Security

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 3-4 Computer Setup—Security

Option	Description
Setup Password	Allows you to set and enable a setup (administrator) password. **NOTE:** If the setup password is set, it is required to change Computer Setup options, flash the ROM, and make changes to certain plug and play settings under Windows.
Power-On Password	Allows you to set and enable a power-on password. The power-on password prompt appears after a power cycle or reboot. If the user does not enter the correct power-on password, the unit will not boot.
Password Options (This selection appears only if a power-on password or setup password is set.)	Allows you to enable/disable: • Lock Legacy Resources (determines whether or not Windows Device Manager is allowed to change resource settings for serial and parallel ports). • Stringent security (enabling the stringent password disables the ability to reset the password by moving the jumper on the system board). Default is disabled. **CAUTION:** If you enable the stringent security feature and you forget the setup password or the power-on password, the computer is inaccessible and can no longer be used. If you lose or forget the password, the system board must be replaced. This scenario is not covered under warranty. To prevent the computer from becoming permanently unusable, record your configured setup password or power-on password in a safe place away from your computer. Without these passwords, the computer cannot be unlocked. • Setup Browse Mode (appears if a setup password is set) (allows viewing, but not changing, the F10 Setup Options without entering setup password). Default is enabled. • Password prompt on F9 & F12 (requires setup password to use these boot functions). Default is enabled. • Network Server Mode. Default is disabled.
Smart Cover	Allows you to: • Lock/unlock the Cover Lock. • Set the Cover Removal Sensor to Disable/Notify User/Setup Password. **NOTE:** *Notify User* alerts the user that the sensor has detected that the cover has been removed. *Setup Password* requires that the setup password be entered to boot the computer if the sensor detects that the cover has been removed.

Table 3-4 Computer Setup—Security (continued)

Device Security	Allows you to set Device Available/Device Hidden (default is Device Available) for: • Embedded security device • System audio • USB controller (varies by model) • Network controller **NOTE:** You must disable AMT before trying to hide the network controller. • Serial port • Parallel port • SATA ports (varies by model)
USB Security	Allows you to set Enabled/Disabled (default is Enabled) for: • Front USB Ports • Rear USB Ports • Accessory USB Ports
Slot Security	Allows you to disable any PCI or PCI Express slot. Default is enabled.
Network Boot	Enables/disables the computer's ability to boot from an operating system installed on a network server. (Feature available on NIC models only; the network controller must be either a PCI expansion card or embedded on the system board.) Default is enabled.
System IDs	Allows you to set: • Asset tag (18-byte identifier), a property identification number assigned by the company to the computer. • Ownership tag (80-byte identifier) displayed during POST. • Universal Unique Identifier (UUID) number. The UUID can only be updated if the current chassis serial number is invalid. (These ID numbers are normally set in the factory and are used to uniquely identify the system.) • Keyboard locale setting for System ID entry.

Table 3-4 Computer Setup—Security (continued)

Master Boot Record Security	Enables/disables Master Boot Record (MBR) security. The MBR contains information needed to successfully boot from a disk and to access the data stored on the disk. Master Boot Record Security may prevent unintentional or malicious changes to the MBR, such as those caused by some viruses or by the incorrect use of certain disk utilities. It also allows you to recover the "last known good" MBR, should changes to the MBR be detected when the system is restarted. When MBR Security is enabled, the BIOS prevents any changes being made to the MBR of the current bootable disk while in MS-DOS or Windows Safe Mode. **NOTE:** Most operating systems control access to the MBR of the current bootable disk; the BIOS cannot prevent changes that may occur while the operating system is running. Restores the backup Master Boot Record to the current bootable disk. Default is disabled. Only appears if all of the following conditions are true: • MBR security is enabled • A backup copy of the MBR has been previously saved • The current bootable disk is the same disk from which the backup copy was saved **CAUTION:** Restoring a previously saved MBR after a disk utility or operating system has modified the MBR, may cause the data on the disk to become inaccessible. Only restore a previously saved MBR if you are confident that the current bootable disk's MBR has been corrupted or infected with a virus.

Table 3-4 Computer Setup—Security (continued)

System Security (these options are hardware dependent)	Data Execution Prevention (enable/disable) - Helps prevent operating system security breaches. Default is enabled. SVM CPU Virtualization (enable/disable). Controls the virtualization features of the processor. Changing this setting requires turning the computer off and then back on. Default is disabled. Virtualization Technology (VTx) (enable/disable) - Controls the virtualization features of the processor. Changing this setting requires turning the computer off and then back on. Default is disabled. Virtualization Technology Directed I/O (VTd) (enable/disable) - Controls virtualization DMA remapping features of the chipset. Changing this setting requires turning the computer off and then back on. Default is disabled. Trusted Execution Technology (enable/disable) - Controls the underlying processor and chipset features needed to support a virtual appliance. Changing this setting requires turning the computer off and then back on. Default is disabled. To enable this feature you must enable the following features: • Embedded Security Device Support • Virtualization Technology • Virtualization Technology Directed I/O Embedded Security Device (enable/disable) - Permits activation and deactivation of the Embedded Security Device. **NOTE:** To configure the Embedded Security Device, a Setup password must be set. • Reset to Factory Settings (Do not reset/Reset) - Resetting to factory defaults will erase all security keys and leave the device in a disabled state. Changing this setting requires that you restart the computer. Default is Do not reset. **CAUTION:** The embedded security device is a critical component of many security schemes. Erasing the security keys will prevent access to data protected by the Embedded Security Device. Choosing Reset to Factory Settings may result in significant data loss. • Measure boot variables/devices to PCR1 - Typically, the computer measures the boot path and saves collected metrics to PCR5 (a register in the Embedded Security Device). Bitlocker tracks changes to any of these metrics, and forces the user to re-authenticate if it detects any changes. Enabling this feature lets you set Bitlocker to ignore detected changes to boot path metrics, thereby avoiding re-authentication issues associated with USB keys inserted in a port. Default is enabled.
System Security (continued)	OS management of Embedded Security Device (enable/disable) - This option allows the user to limit OS control of the Embedded Security Device. Default is enabled. This option is automatically disabled if Trusted Execution Technology is enabled. • Reset of Embedded Security Device through OS (enable/disable) - This option allows the user to limit the operating system ability to request a Reset to Factory Settings of the Embedded Security Device. Default is disabled. **NOTE:** To enable this option, a Setup password must be set. • No PPI provisioning (Windows 8 only) - This option lets you set Windows 8 to bypass the PPI (Physical Presence Interface) requirement and directly enable and take ownership of the TPM on first boot. You cannot change this setting after TPM is owned/initialized, unless the TPM is reset. Default is disabled for non-Windows 8 systems, and enabled for Windows 8. • Allow PPI policy to be changed by OS. Enabling this option allows the operating system to execute TPM operations without Physical Presence Interface. Default is disabled. **NOTE:** To enable this option, a Setup password must be set.

Table 3-4 Computer Setup—Security (continued)

DriveLock Security	Allows you to assign or modify a master or user password for hard drives. When this feature is enabled, the user is prompted to provide one of the DriveLock passwords during POST. If neither is successfully entered, the hard drive will remain inaccessible until one of the passwords is successfully provided during a subsequent cold-boot sequence. **NOTE:** This selection will only appear when at least one drive that supports the DriveLock feature is attached to the system.
Secure Boot Configuration	This is a feature of Windows 8. • Legacy Support—Enable/Disable. Allows you to turn off all legacy support on the computer, including booting to DOS, running legacy graphics cards, booting to legacy devices, and so on. If set to disable, legacy boot options in **Storage > Boot Order** are not displayed. Default is enabled. • Secure Boot—Enable/Disable. Allows you to make sure an operating system is legitimate before booting to it, making Windows resistant to malicious modification from preboot to full OS booting, preventing firmware attacks. UEFI and Windows Secure Boot only allow code signed by pre-approved digital certificates to run during the firmware and OS boot process. Default is disabled, except for Windows 8 systems which have this setting enabled. Secure Boot enabled also sets **Legacy Support** to disabled. • Key Management—This option lets you manage the custom key settings. ◦ Clear Secure Boot Keys—Don't Clear/Clear. Allows you to delete any previously loaded custom boot keys. Default is Don't Clear. ◦ Key Ownership—HP Keys/Custom Keys. Selecting Custom Mode allows you to modify the contents of the secure boot signature databases and the platform key (PK) that verifies kernels during system start up, allowing you to use alternative operating systems. Selecting HP Keys causes the computer boot using the preloaded HP-specific boot keys. Default is HP Keys. • Fast Boot—Enable/Disable. Fast boot disables the ability to interrupt boot, such as pressing f keys to access items before the operating system loads. Default is disabled. **NOTE:** If Windows 8 detects a serious error, it will interrupt the boot process automatically and display advanced boot options. From Windows 8, you can press Shift and select **Restart** to access the screen that lets you boot to a device or troubleshoot your computer.

Computer Setup—Power

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 3-5 Computer Setup—Power

Option	Description
OS Power Management	• Idle Power Savings—Extended/Normal. Allows certain operating systems to decrease the processors power consumption when the processor is idle. Default is extended. • Runtime Power Management— Enable/Disable. Allows certain operating systems to reduce processor voltage and frequency when the current software load does not require the full capabilities of the processor. Default is enabled. • Unique Sleep State Blink Rates—Enable/Disable. This feature is designed to provide a visual indication of what sleep state the system is in. Each sleep state has a unique blink pattern. Default is disabled. **NOTE:** For Windows 8 systems with Fast Boot support, a normal shutdown goes to the S4 state, not the S5 state. ◦ S0 (On) = Solid green LED. ◦ S3 (Stand By)= 3 blinks at 1Hz (50% duty cycle) followed by a pause of 2 seconds (green LED) — repeated cycles of 3 blinks and a pause. ◦ S4 (Hibernation)= 4 blinks at 1Hz (50% duty cycle) followed by a pause of 2 seconds (green LED) — repeated cycles of 4 blinks and a pause. ◦ S5 (Soft Off) = LED is off.
Hardware Power Management	SATA Power Management – Enables or disables SATA bus and/or device power management. Default is enabled. S5 Maximum Power Savings – Turns off power to all nonessential hardware when system is off to meet EUP Lot 6 requirement of less than 0.5 Watt power usage. Default is disabled. PCI Express x16 Slot 1 – Sets Active State Power Management (ASPM) of the bus. ASPM lets you set lower power modes that activate when the bus is not being used. Options are Disabled, LOs, L1, LOs and L1. Default is ASPM Disabled. PCI Express x1 Slot 1 – Sets Active State Power Management (ASPM) of the bus. ASPM lets you set lower power modes that activate when the bus is not being used. Options are Disabled, LOs, L1, LOs and L1. Default is ASPM Disabled. Network Controller – Sets ASPM of the bus. ASPM lets you set lower power modes that activate when the bus is not being used. Options are Disabled, LOs, L1, LOs and L1. Default is ASPM Disabled. USB 3.0 Controller – Sets ASPM of the bus. ASPM lets you set lower power modes that activate when the bus is not being used. Options are Disabled, LOs, L1, LOs and L1. Default is ASPM Disabled.
Thermal	Fan idle mode—This bar graph controls the minimum permitted fan speed. **NOTE:** This setting only changes the minimum fan speed. The fans are still automatically controlled.

Computer Setup—Advanced

NOTE: Support for specific Computer Setup options may vary depending on the hardware configuration.

Table 3-6 Computer Setup—Advanced (for advanced users)

Option	Heading
Power-On Options	Allows you to set: • POST mode (QuickBoot, Clear Memory, FullBoot, or FullBoot Every x Days). ◦ QuickBoot (default) = Do not clear memory or perform a memory test. ◦ FullBoot = Memory test (count) on cold boot. Clears memory on all boots. ◦ Clear Memory = No memory count on cold boot. Clears memory on all boots. ◦ FullBoot Every x Days = Memory count on 1st cold boot on or after the xth day. No more memory counts until 1st cold boot on or after x days. Clears memory on all boots. • POST messages (enable/disable). Enabling this feature will cause the system to display POST error messages, which are error messages displayed on the monitor during the Power On Self Test if the BIOS encounters some kind of problem while starting the PC. A POST error message will only display on screen if the computer is capable of booting this far. If the POST detects an error before this point, a beep code is generated instead. Default is disabled. • Press the ESC key for Startup Menu (Enable/Disable). This feature controls the display of the text “Press the ESC key for Startup Menu” during POST. This text does not display on Windows 8 systems with Fast Boot support. Other text also will not display (for example, Ownership Tag). Default is enabled. • Option ROM Prompt (enable/disable). Enabling this feature will cause the system to display a message before loading option ROMs. Default is enabled. • After Power Loss (off/on/previous state). Default is Power off. Setting this option to: ◦ Power off—causes the computer to remain powered off when power is restored. ◦ Power on—causes the computer to power on automatically as soon as power is restored. ◦ Previous state—causes the computer to power on automatically as soon as power is restored, if it was on when power was lost. **NOTE:** If you turn off power to the computer using the switch on a power strip, you will not be able to use the suspend/sleep feature or the Remote Management features. • POST Delay (in seconds). Enabling this feature will add a user-specified delay to the POST process. This delay is sometimes needed for hard disks on some PCI cards that spin up very slowly, so slowly that they are not ready to boot by the time POST is finished. The POST delay also gives you more time to select F10 to enter Computer (F10) Setup. Default is None. • Remote Wakeup Boot Source (remote server/local hard drive). Default is Local hard drive. • Factory Recovery Boot Support (Enable/Disable). Provides the ability for the BIOS to redirect the boot to the recovery partition on the user hard drive, if present. Some versions of the recovery software honor the F11 key press even when this feature is disabled by the BIOS. Default is disabled. • Bypass F1 Prompt on Configuration Changes (Enable/Disable). Allows you to set the computer not to confirm when changes were made. Default is disabled.

Table 3-6 Computer Setup—Advanced (for advanced users) (continued)

BIOS Power-On	Allows you to set the computer to turn on automatically at a time you specify.
Onboard Devices	Allows you to set resources for or disable Legacy devices. Select the Legacy device's IRQ, DMA, and I/O Range. The settings may not take effect for all operating systems. To hide a device from the operating system, see Security > Device Security.
Bus Options	Allows you to enable or disable: • PCI SERR# Generation. Default is enabled. • PCI VGA Palette Snooping, which sets the VGA palette snooping bit in PCI configuration space; only needed when more than one graphics controller is installed. Default is disabled.
Device Options	Allows you to set: • Printer mode (Bi-Directional, EPP + ECP, Output Only). ECP = Enhanced Capabilities Port, EPP = Enhanced Parallel Port. Default is EPP+ECP. • Num Lock State at Power-On (off/on). Default is off. • Integrated Video (enable/disable). Use this option to disable the integrated video controller when another video controller is present in the system. Default is enabled. • Integrated Graphics (Auto/Disable/Force) Use this option to manage integrated (UMA) graphics memory allocation. The value you choose is allocated permanently to graphics and is unavailable to the operating system. For example, if you set this value to 512M on a system with 2 GB of RAM, the system always allocates 512 MB for graphics and the other 1.5 GB for use by the BIOS and operating system. Default is Auto which sets memory allocation to 512 MB. If you select Force, the UMA Frame Buffer Size option displays, which lets you set the UMA memory size allocation between 32 MB and 1 GB. • Internal Speaker (does not affect external speakers). Default is enabled. • NIC PXE Option ROM Download (PXE, iSCSI, disabled). The BIOS contains an embedded NIC option ROM to allow the unit to boot through the network to a PXE server. This is typically used to download a corporate image to a hard drive. The NIC option ROM takes up memory space below 1MB commonly referred to as DOS Compatibility Hole (DCH) space. This space is limited. This F10 option will allow users to disable the downloading of this embedded NIC option ROM thus giving more DCH space for additional PCI cards which may need option ROM space. The default will be to have the NIC option-ROM-enabled. Default is PXE. • SATA RAID Option ROM Download (enable/disable). The BIOS contains an embedded SATA RAID option ROM for RAID support. This can be temporarily disabled to save DCH space. Note that with the option ROM disabled, users will be unable to boot to hard drives in the system while running in RAID mode. Default is disabled. • Multi-Processor (enable/disable). Use this option to disable multi-processor support under the OS. Default is enabled. • Hyper threading (enable/disable). Use this option to disable processor hyper-threading. • Turbo Mode (enable/disable). Allows you to enable and disable the Intel Turbo Mode feature, which allows one core of the system to run at a higher than standard frequency and power if other cores are idle. Default is enabled.

Table 3-6 Computer Setup—Advanced (for advanced users) (continued)

VGA Configuration	Displayed only if there is an add-in video card in the system. Allows you to specify which VGA controller will be the “boot” or primary VGA controller.
AMT Configuration	Allows you to set: • AMT (enable/disable). Allows you to enable or disable functions of the embedded Management Engine (ME) such as Active Management Technology (AMT). If set to disable, the Management Engine is set to a temporarily disabled state and will not provide functions beyond necessary system configuration. Default is enabled. • Unconfigure AMT/ME (enable/disable). Allows you to unconfigure any provisioned management settings for AMT. The AMT settings are restored to factory defaults. This feature should be used with caution as AMT will not be able to provide any set AMT management functions once unconfigured. Default is disabled. • Hide Unconfigure ME Confirmation Prompt (enable/disable). Allows you to set the system to not display the confirmation to unconfigure ME. • Watchdog Timer (enable/disable). Allows you to set amount of time for a operating system and BIOS watchdog alert to be sent if the timers are not deactivated. BIOS watchdog is deactivated by BIOS and would indicate that a halt occurred during execution if the alert is sent to the management console. An operating system alert is deactivated by the operating system image and would indicate that a hang occurred during its initialization. Default is enabled.

Recovering the Configuration Settings

This method of recovery requires that you first perform the **Save to Removable Media** command with the Computer Setup (F10) Utility before **Restore** is needed. (See Computer Setup—File on page 14 in the Computer Setup—File table.)

NOTE: It is recommended that you save any modified computer configuration settings to a USB flash media device and save the device for possible future use.

To restore the configuration, insert the USB flash media device with the saved configuration and perform the **Restore from Removable Media** command with the Computer Setup (F10) Utility. (See Computer Setup—File on page 14 in the Computer Setup—File table.)

4 HP PC Hardware Diagnostics

To help troubleshoot and diagnose failures, use the UEFI-based hardware diagnostic solution that HP includes on all products. This tool can even be used if the computer will not boot to the operating system.

Why run HP PC Hardware Diagnostics – UEFI

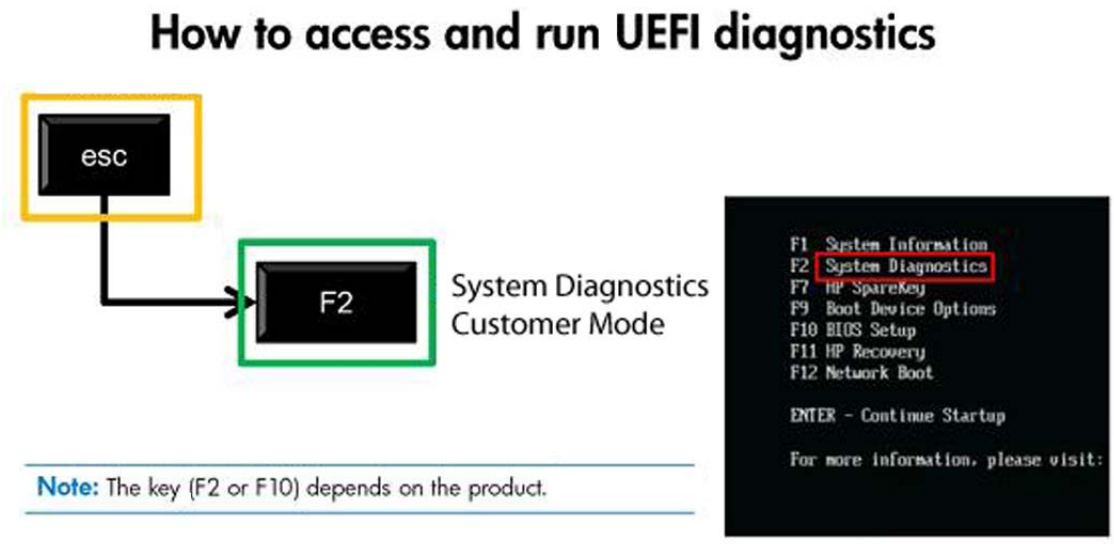
The HP PC Hardware Diagnostic tools simplify the process of diagnosing hardware issues and expedite the support process when issues are found. The tools save time by pinpointing the component that needs to be replaced.

- **Isolate true hardware failures**: The diagnostics run outside of the operating system so they effectively isolate hardware failures from issues that may be caused by the operating system or other software components.
- **Failure ID**: When a failure is detected that requires hardware replacement, a 24-digit Failure ID is generated. This ID can then be provided to the call agent, who will either schedule support or provide replacement parts.

How to access and run HP PC Hardware Diagnostics - UEFI

To access the UEFI diagnostics:

1. Restart or turn on the computer and press Esc repeatedly until the BIOS boot menu appears.
2. Press F2 or select **Diagnostics (F2)**.



After pressing F2, the BIOS sequentially searches three places for the system diagnostics:

a. **First** – a connected USB drive (to download the diagnostics tools to a USB drive, see the instructions in Downloading HP PC Hardware Diagnostics to a USB device on page 28).

b. **Second** – the hard disk drive.

c. **Third** – in the BIOS, a core set of diagnostics (for memory and hard disk drive) that are accessible only if the USB or hard disk drive versions are not detected.

Downloading HP PC Hardware Diagnostics to a USB device

1. Go to http://www.hp.com.
2. Click the **Support & Drivers** link.
3. Select the **Drivers & Software** tab.
4. Enter the product name in the text box and click **Search**.
5. Select your specific computer model.
6. Select your operating system.
7. In the Diagnostic section, click the **HP UEFI Support Environment** link. This link provides additional information.

   - or -

   Click the **Download** button and select **Run**. The download includes instructions (in English) on how to install the tools on the USB device.

NOTE: HP diagnostic solutions are developed to test components typically included on HP products. They may not diagnose all third-party accessories that can be added to the system.

5 Serial ATA (SATA) Drive Guidelines and Features

NOTE: HP only supports the use of SATA hard drives on these models of computer. No Parallel ATA (PATA) drives are supported.

SATA Hard Drives

Serial ATA Hard Drive Characteristics	
Number of pins/conductors in data cable	7/7
Number of pins in power cable	15
Maximum data cable length	39.37 in (100 cm)
Data interface voltage differential	400-700 mV
Drive voltages	3.3 V, 5 V, 12 V
Jumpers for configuring drive	N/A
Data transfer rate	3.0 Gb/s

SATA Hard Drive Cables

SATA Data Cable

Always use an HP approved SATA 3.0 Gb/s cable as it is fully backwards compatible with the SATA 1.5 Gb/s drives.

Current HP desktop products ship with SATA 3.0 Gb/s hard drives.

SATA data cables are susceptible to damage if overflexed. Never crease a SATA data cable and never bend it tighter than a 30 mm (1.18 in) radius.

The SATA data cable is a thin, 7-pin cable designed to transmit data for only a single drive.

SMART ATA Drives

The Self Monitoring Analysis and Recording Technology (SMART) ATA drives for the HP Personal Computers have built-in drive failure prediction that warns the user or network administrator of an impending failure or crash of the hard drive. The SMART drive tracks fault prediction and failure indication parameters such as reallocated sector count, spin retry count, and calibration retry count. If the drive determines that a failure is imminent, it generates a fault alert.

6 Routine Care and Disassembly Preparation

This chapter provides general service information for the computer. Adherence to the procedures and precautions described in this chapter is essential for proper service.

⚠ **CAUTION:** When the computer is plugged into an AC power source, voltage is always applied to the system board. You must disconnect the power cord from the power source before opening the computer to prevent system board or component damage.

Electrostatic discharge information

A sudden discharge of static electricity from your finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs. An electronic device exposed to electrostatic discharge (ESD) may not appear to be affected at all and can work perfectly throughout a normal cycle. The device may function normally for a while, but it has been degraded in the internal layers, reducing its life expectancy.

Networks built into many integrated circuits provide some protection, but in many cases, the discharge contains enough power to alter device parameters or melt silicon junctions.

Generating static

The following table shows that:

- Different activities generate different amounts of static electricity.
- Static electricity increases as humidity decreases.

	Relative Humidity		
Event	**55%**	**40%**	**10%**
Walking across carpet	7,500 V	15,000 V	35,000 V
Walking across vinyl floor	3,000 V	5,000 V	12,000 V
Motions of bench worker	400 V	800 V	6,000 V
Removing DIPs* from plastic tube	400 V	700 V	2,000 V
Removing DIPs* from vinyl tray	2,000 V	4,000 V	11,500 V
Removing DIPs* from Styrofoam	3,500 V	5,000 V	14,500 V
Removing bubble pack from PCB	7,000 V	20,000 V	26,500 V
Packing PCBs in foam-lined box	5,000 V	11,000 V	21,000 V

*These are then multi-packaged inside plastic tubes, trays, or Styrofoam.

NOTE: 700 volts can degrade a product.

Preventing electrostatic damage to equipment

Many electronic components are sensitive to ESD. Circuitry design and structure determine the degree of sensitivity. The following packaging and grounding precautions are necessary to prevent damage to electric components and accessories.

- To avoid hand contact, transport products in static-safe containers such as tubes, bags, or boxes.
- Protect all electrostatic parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic sensitive parts in their containers until they arrive at static-free stations.
- Place items on a grounded surface before removing them from their container.

- Always be properly grounded when touching a sensitive component or assembly.
- Avoid contact with pins, leads, or circuitry.
- Place reusable electrostatic-sensitive parts from assemblies in protective packaging or conductive foam.

Personal grounding methods and equipment

Use the following equipment to prevent static electricity damage to equipment:

- **Wrist straps** are flexible straps with a maximum of one-megohm ± 10% resistance in the ground cords. To provide proper ground, a strap must be worn snug against bare skin. The ground cord must be connected and fit snugly into the banana plug connector on the grounding mat or workstation.
- **Heel straps/Toe straps/Boot straps** can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use them on both feet with a maximum of one-megohm ± 10% resistance between the operator and ground.

Static Shielding Protection Levels	
Method	**Voltage**
Antistatic plastic	1,500
Carbon-loaded plastic	7,500
Metallized laminate	15,000

Grounding the work area

To prevent static damage at the work area, use the following precautions:

- Cover the work surface with approved static-dissipative material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Use static-dissipative mats, foot straps, or air ionizers to give added protection.
- Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static-free work areas.
- Turn off power and input signals before inserting and removing connectors or test equipment.
- Use fixtures made of static-safe materials when fixtures must directly contact dissipative surfaces.
- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and Styrofoam.
- Use field service tools, such as cutters, screwdrivers, and vacuums, that are conductive.

Recommended materials and equipment

Materials and equipment that are recommended for use in preventing static electricity include:

- Antistatic tape
- Antistatic smocks, aprons, or sleeve protectors

- Conductive bins and other assembly or soldering aids
- Conductive foam
- Conductive tabletop workstations with ground cord of one-megohm +/- 10% resistance
- Static-dissipative table or floor mats with hard tie to ground
- Field service kits
- Static awareness labels
- Wrist straps and footwear straps providing one-megohm +/- 10% resistance
- Material handling packages
- Conductive plastic bags
- Conductive plastic tubes
- Conductive tote boxes
- Opaque shielding bags
- Transparent metallized shielding bags
- Transparent shielding tubes

Operating Guidelines

To prevent overheating and to help prolong the life of the computer:

- Keep the computer away from excessive moisture, direct sunlight, and extremes of heat and cold.
- Operate the computer on a sturdy, level surface. Leave a 10.2-cm (4-inch) clearance on all vented sides of the computer and above the monitor to permit the required airflow.
- Never restrict the airflow into the computer by blocking any vents or air intakes. Do not place the keyboard, with the keyboard feet down, directly against the front of the desktop unit as this also restricts airflow.
- Occasionally clean the air vents on all vented sides of the computer. Lint, dust, and other foreign matter can block the vents and limit the airflow. Be sure to unplug the computer before cleaning the air vents.
- Never operate the computer with the cover removed.
- Do not place computers so near each other that they are subject to each other's re-circulated or preheated air.
- Keep liquids away from the computer and keyboard.
- Never cover the ventilation slots on the monitor with any type of material.
- Install or enable power management functions of the operating system or other software, including sleep states.

Routine Care

General cleaning safety precautions

1. Never use solvents or flammable solutions to clean the computer.
2. Never immerse any parts in water or cleaning solutions; apply any liquids to a clean cloth and then use the cloth on the component.
3. Always unplug the computer when cleaning with liquids or damp cloths.
4. Always unplug the computer before cleaning the keyboard, mouse, or air vents.
5. Disconnect the keyboard before cleaning it.
6. Wear safety glasses equipped with side shields when cleaning the keyboard.

Cleaning the computer case

Follow all safety precautions in General cleaning safety precautions on page 35 before cleaning the computer.

To clean the computer case, follow the procedures described below:

- To remove light stains or dirt, use plain water with a clean, lint-free cloth or swab.
- For stronger stains, use a mild dishwashing liquid diluted with water. Rinse well by wiping it with a cloth or swab dampened with clear water.
- For stubborn stains, use isopropyl (rubbing) alcohol. No rinsing is needed as the alcohol will evaporate quickly and not leave a residue.
- After cleaning, always wipe the unit with a clean, lint-free cloth.
- Occasionally clean the air vents on the computer. Lint and other foreign matter can block the vents and limit the airflow.

Cleaning the keyboard

Follow all safety precautions in General cleaning safety precautions on page 35 before cleaning the keyboard.

To clean the tops of the keys or the keyboard body, follow the procedures described in Cleaning the computer case on page 35.

When cleaning debris from under the keys, review all rules in General cleaning safety precautions on page 35 before following these procedures:

⚠ **CAUTION:** Use safety glasses equipped with side shields before attempting to clean debris from under the keys.

- Visible debris underneath or between the keys may be removed by vacuuming or shaking.
- Canned, pressurized air may be used to clean debris from under the keys. Caution should be used as too much air pressure can dislodge lubricants applied under the wide keys.

- If you remove a key, use a specially designed key puller to prevent damage to the keys. This tool is available through many electronic supply outlets.

CAUTION: Never remove a wide leveled key (like the space bar) from the keyboard. If these keys are improperly removed or installed, the keyboard may not function properly.

- Cleaning under a key may be done with a swab moistened with isopropyl alcohol and squeezed out. Be careful not to wipe away lubricants necessary for proper key functions. Use tweezers to remove any fibers or dirt in confined areas. Allow the parts to air dry before reassembly.

Cleaning the display

- Wipe the display screen with a clean cloth moistened with water or with a towelette designed for cleaning monitors. Do not use sprays or aerosols directly on the screen; the liquid may seep into the housing and damage a component. Never use solvents or flammable liquids on the monitor.
- To clean the monitor body follow the procedures in Cleaning the computer case on page 35.

Cleaning the mouse

Before cleaning the mouse, ensure that the power to the computer is turned off.

- Clean the mouse ball by first removing the retaining plate and the ball from the housing. Pull out any debris from the ball socket and wipe the ball with a clean, dry cloth before reassembly.
- To clean the mouse body, follow the procedures in Cleaning the computer case on page 35.

Service Considerations

Listed below are some of the considerations that you should keep in mind during the disassembly and assembly of the computer.

Tools and software requirements

To service the computer, you need the following:

- Torx T-15 screwdriver (HP screwdriver with bits, PN 161946-001)
- Flat-bladed screwdriver (may sometimes be used in place of the Torx screwdriver)
- Phillips #2 screwdriver
- Diagnostics software
- HP tamper-resistant T-15 wrench (Smart Cover FailSafe Key, PN 166527-001) or HP tamper-resistant bits (Smart Cover FailSafe Key, PN 166527-002)

Screws

The screws used in the computer are not interchangeable. They may have standard or metric threads and may be of different lengths. If an incorrect screw is used during the reassembly process, it can damage the unit. HP strongly recommends that all screws removed during disassembly be kept with the part that was removed, then returned to their proper locations.

CAUTION: As each subassembly is removed from the computer, it should be placed away from the work area to prevent damage.

Cables and connectors

Most cables used throughout the unit are flat, flexible cables. These cables must be handled with care to avoid damage. Apply only the tension required to seat or unseat the cables during insertion or removal from the connector. Handle cables by the connector whenever possible. In all cases, avoid bending or twisting the cables, and ensure that the cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced.

⚠ **CAUTION:** When servicing this computer, ensure that cables are placed in their proper location during the reassembly process. Improper cable placement can damage the computer.

Hard drives

Handle hard drives as delicate, precision components, avoiding all physical shock and vibration. This applies to failed drives as well as replacement spares.

- If a drive must be mailed, place the drive in a bubble-pack mailer or other suitable protective packaging and label the package “Fragile: Handle With Care.”
- Do not remove hard drives from the shipping package for storage. Keep hard drives in their protective packaging until they are actually mounted in the CPU.
- Avoid dropping drives from any height onto any surface.
- If you are inserting or removing a hard drive, turn off the computer. Do not remove a hard drive while the computer is on or in standby mode.
- Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector. For more information about preventing electrostatic damage, refer to Electrostatic discharge information on page 32
- Do not use excessive force when inserting a drive.
- Avoid exposing a hard drive to liquids, temperature extremes, or products that have magnetic fields such as monitors or speakers.

Lithium coin cell battery

The battery that comes with the computer provides power to the real-time clock and has a minimum lifetime of about three years.

See the appropriate removal and replacement chapter for the chassis you are working on in this guide for instructions on the replacement procedures.

⚠ **WARNING!** This computer contains a lithium battery. There is a risk of fire and chemical burn if the battery is handled improperly. Do not disassemble, crush, puncture, short external contacts, dispose in water or fire, or expose it to temperatures higher than 140ºF (60ºC). Do not attempt to recharge the battery.

NOTE: Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. In order to forward them to recycling or proper disposal, please use the public collection system or return them to HP, their authorized partners, or their agents.

7 Removal and Replacement Procedures All-in One (AIO) Chassis

The following sections provide information about disassembling various components of the computer.

Procedures for disassembling both 6300 and 8300 models are the same unless noted.

Preparing to disassemble the computer

To avoid injury and equipment damage, always complete the following steps in order, when opening the HP Pro All-in-One.

1. Remove all media from the computer.
2. Shut down the computer.
3. After the system has completely shut down, disconnect the power adapter from the back of the computer.
4. Disconnect all other attached cables from the back of the computer.
5. If the height adjustable/recline stand is installed, before laying the computer down for service, position the computer vertically by grasping the sides of the display, and then raise the display to the highest position.

   Place the computer face down on a soft flat surface. HP recommends that you set down a blanket, towel, or other soft cloth to protect the screen surface from scratches or other damage.

WARNING! If the height adjustable/recline stand is installed, do not lay the computer down with the sliding stand in the low position. The stand may suddenly release which could cause damage to equipment or injury.

WARNING! Beware of sharp edges inside the chassis.

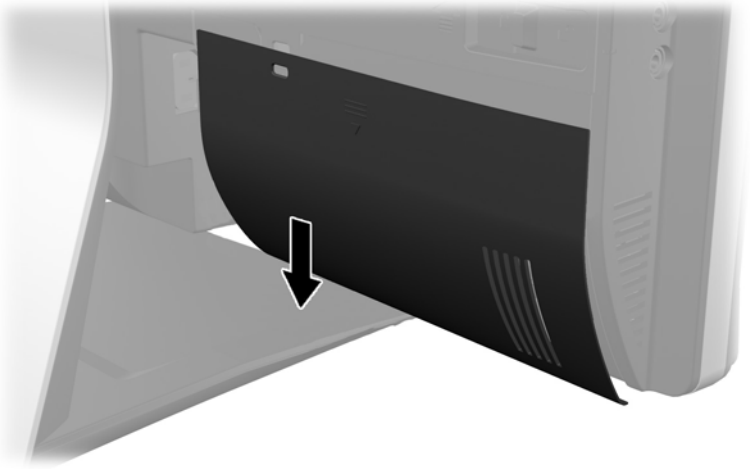
Removing the rear port cover

1. If a cable lock is installed on the rear of the unit, remove the lock.
2. Grasp the rear port cover, then pull it down and off the computer.

NOTE: Removing the rear port cover may require that you use a significant amount of force.

NOTE: If using forceful pressure on the ribs does not remove security cover, grip the exposed edge of the security cover by the AC plug and pull it straight out.

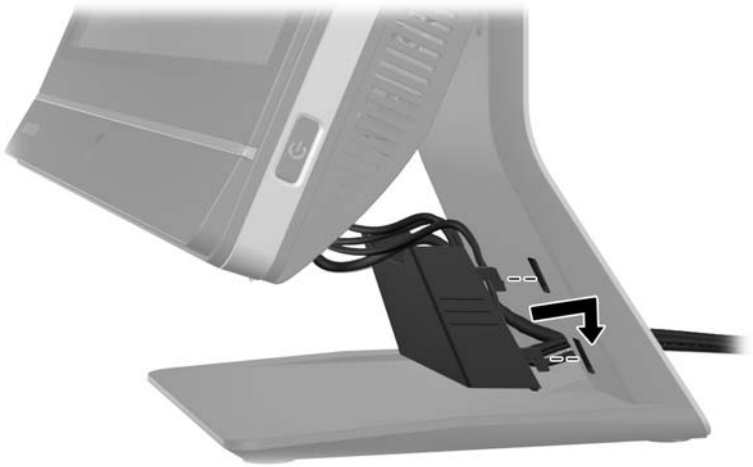
Figure 7-1 Removing the rear port cover



Cable management cover

1. If the rear port cover is installed, remove the cover.
2. Route all peripheral cables through the stand opening and plug them into the appropriate ports as needed.
3. Hold the cable management cover under the cables, align the cover hooks with the slots in the stand, and then insert the cover and slide it down.

Figure 7-2 Installing the cable management cover

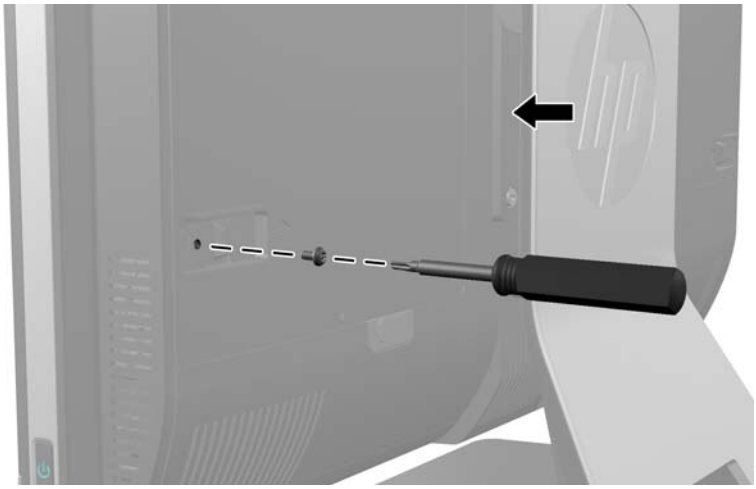


Installing an access panel security screw

You may prevent access to internal components by securing the access panel. Screw a T15 tamper-resistant Torx screw through the left latch of the access panel to prevent removal of the panel.

NOTE: Spare parts for the security screw or associated hardware are not provided.

Figure 7-3 Securing the access panel



Synchronizing the optional wireless keyboard or mouse

The optional wireless keyboard and mouse are easy to set up. Just remove the battery tabs on both the keyboard and the mouse to activate the preinstalled batteries. Also, make sure the Power switch on the bottom of the mouse is in the On position (the keyboard does not have a Power switch). Then, turn on the computer and synchronize them as described below.

NOTE: For better mouse battery life and performance, avoid using your mouse on a dark or high-gloss surface, and turn mouse power off when not in use.

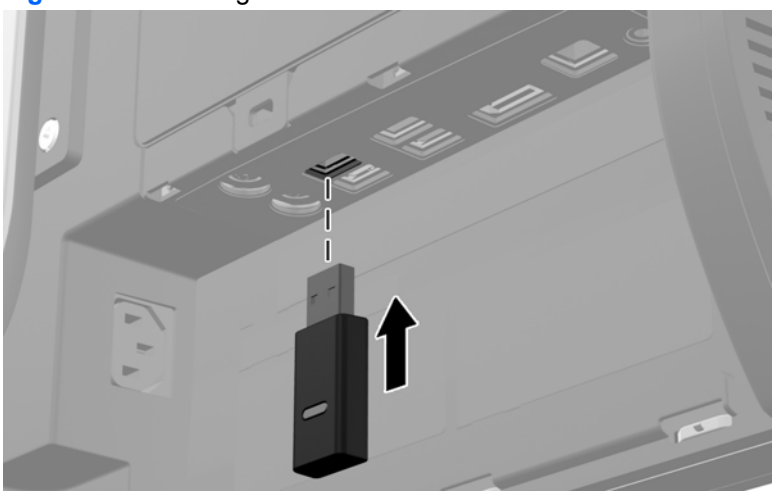
To synchronize the wireless keyboard and mouse:

1. Make sure the keyboard and mouse are next to the computer, within 30 cm (1 foot) and away from interference from other devices.
2. Turn on the computer.

3. Insert the wireless receiver into a USB 2.0 port on the computer.

NOTE: Insert the wireless receiver into a USB 2.0 port that is separated from USB 3.0 devices.

Figure 7-4 Installing the wireless receiver

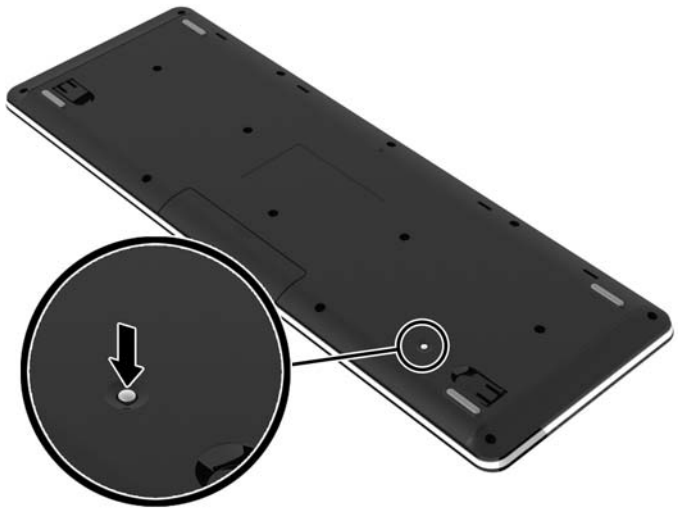


4. Make sure the Power switch on the bottom of the mouse is in the On position.

5. Press and release the Connect button on the bottom of the mouse. The blue activity LED from the wireless receiver illuminates when the synchronization command has been received and turns off when synchronization is complete.

6. Press and release the Connect button on the bottom of the keyboard. The blue activity LED from the wireless receiver illuminates when the synchronization command has been received and turns off when synchronization is complete.

Figure 7-5 Synchronizing the wireless keyboard and mouse



NOTE: If the procedure does not work, remove and then reinsert the wireless keyboard and mouse receiver from the back of the computer and then synchronize the keyboard and mouse again. If synchronization still does not work, remove and replace the batteries.

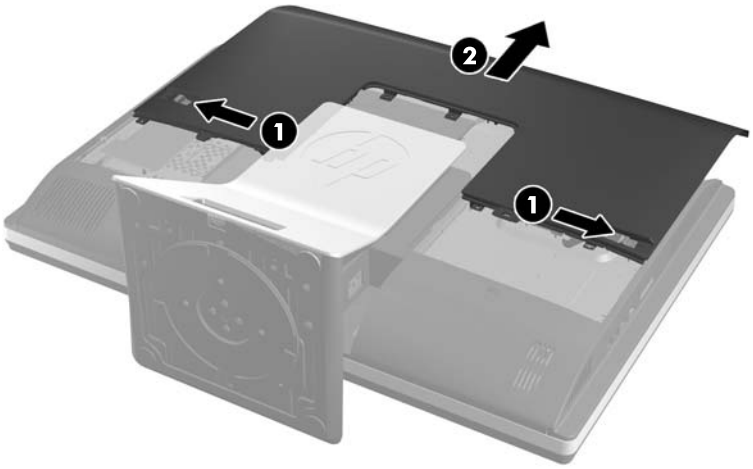
Access panel

The computer has one main rear access panel that allows access to internal components.

To remove the access panel:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Slide the access panel latches toward the edges of the unit, then slide the access panel toward the top of the computer until it slides off the unit.

Figure 7-6 Removing the access panel



3. To replace the access panel, hold the panel at a 90-degree angle, place the top into the guides in the chassis, and then press down to align it with the guides.

Figure 7-7 Replacing the access panel

NOTE: Align the bottom of the access panel with the notches on the outside edge of the computer **(1)** when installing.

If an access panel sensor is installed, make sure the tab **(2)** on the bottom of the access panel slides over the sensor **(3)** when replacing the access panel.

Figure 7-8 Access Panel Replacement

4. Push the access panel firmly into place until correctly seated.

To replace the access panel, reverse the removal procedures.

Stand

The stand is secured with two captive Torx screws. You must remove a plastic cover to gain access to the screws. You must remove the access panel to remove the stand.

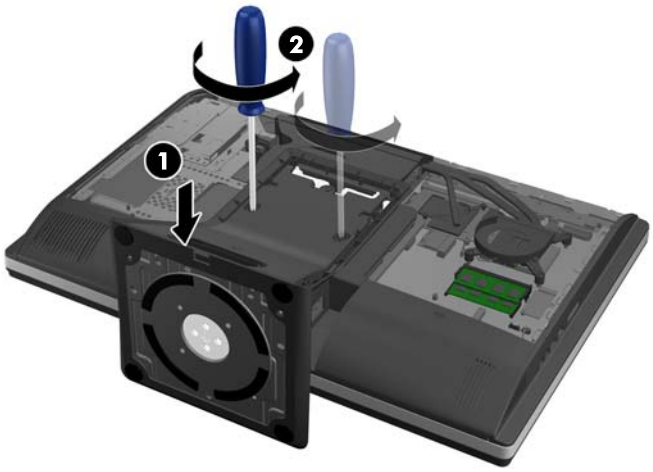
To remove the stand:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Push the release button **(1)** on the bottom of the stand and pull the back of the stand off **(2)**.

Figure 7-9 Removing the back of the stand

4. Push the base of the stand down **(1)**, and loosen the two captive Torx screws securing the stand to the chassis **(2)**.

Figure 7-10 Releasing the stand



5. Lift the stand up and off the computer.

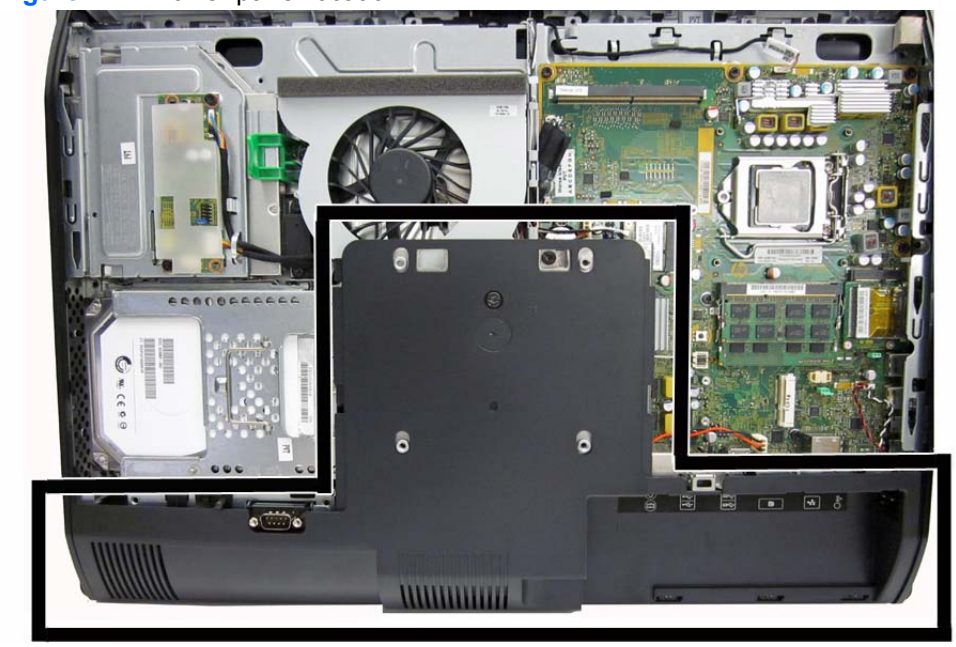
Figure 7-11 Removing the stand

To replace the stand, reverse the removal procedures.

Lower panel

The lower panel is located under the stand and on the bottom part of the computer.

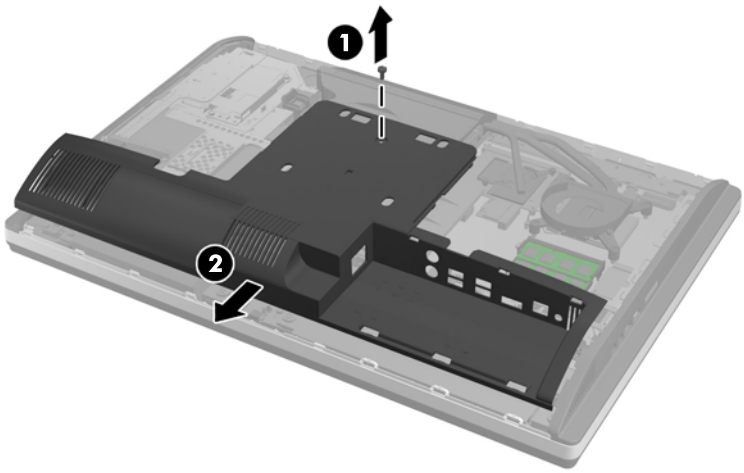
Figure 7-12 Lower panel location



To remove the access panel:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the stand (see Stand on page 44).
4. Remove the screw **(1)** in the middle of the lower panel, and detach the lower panel from the chassis **(2)**.

Figure 7-13 Removing the lower panel

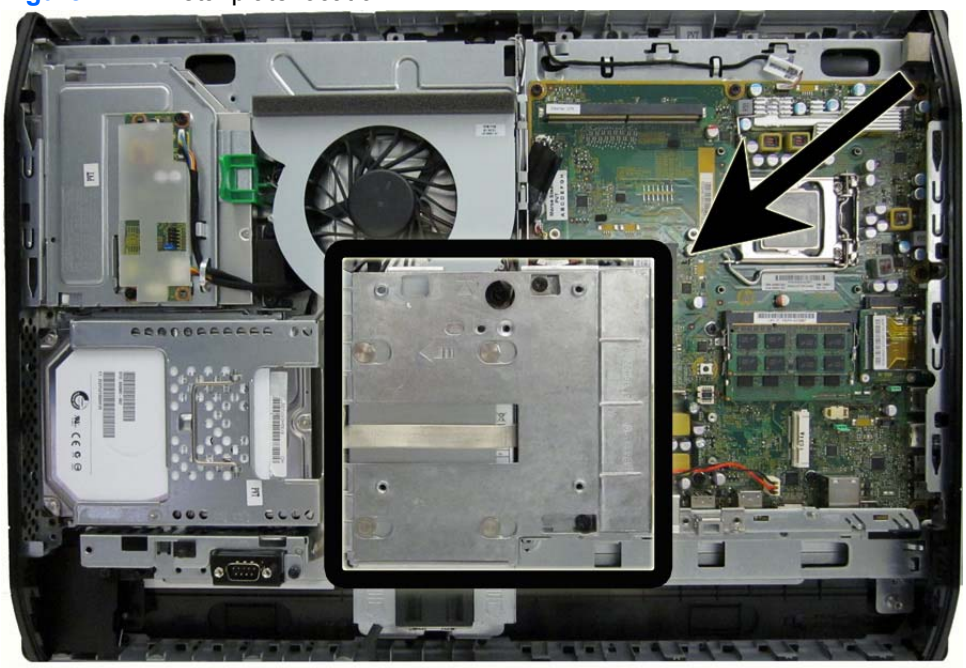


To replace the lower panel, reverse the removal procedures.

Metal plate

The metal plate is located under the stand.

Figure 7-14 Metal plate location

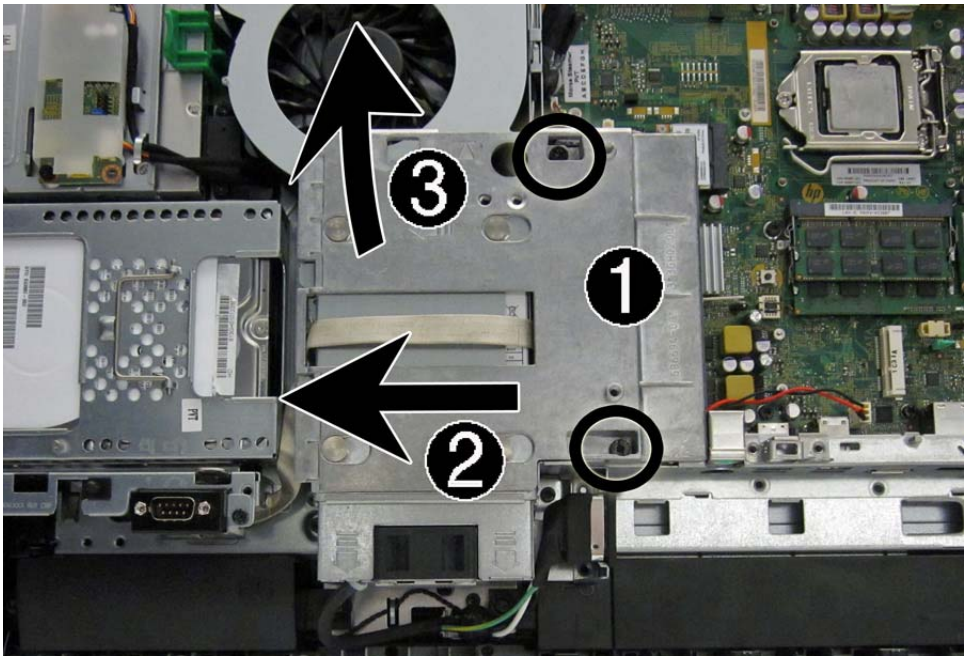


To remove the metal plate:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the stand (see Stand on page 44).
4. Remove the lower panel (see Lower panel on page 46).
5. Remove the two Torx screws **(1)** securing the metal plate to the chassis.

6. Slide the metal plate left to the left **(2)**, and then lift it off the chassis **(3)**.

Figure 7-15 Removing the metal plate



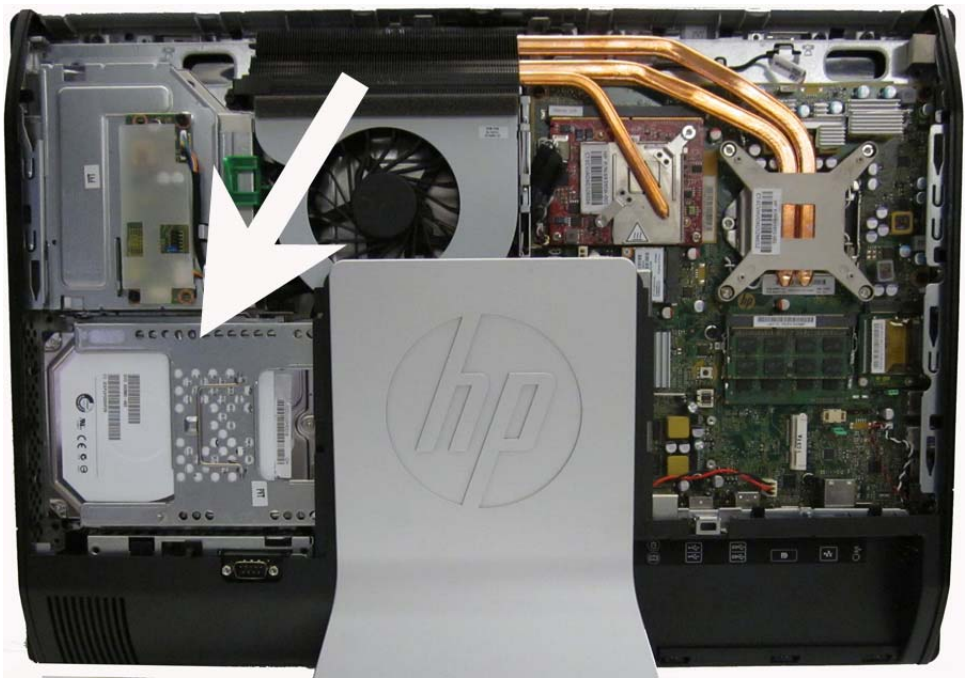
To replace the lower panel, reverse the removal procedures.

Replacing drives

Replacing the hard disc drive with a 3.5-inch hard disc drive or a single 2.5-inch drive

The hard disc drive is located behind the access panel on the left side of the computer (when viewed from behind). The drive is housed in a removable cage.

Figure 7-16 Hard drive location



If you choose to install an optional 2.5-inch solid state drive (SSD) or self-encrypting drive (SED), you will need a drive adapter. The drive adapter is not included in the 2.5-inch SSD spare parts kits.

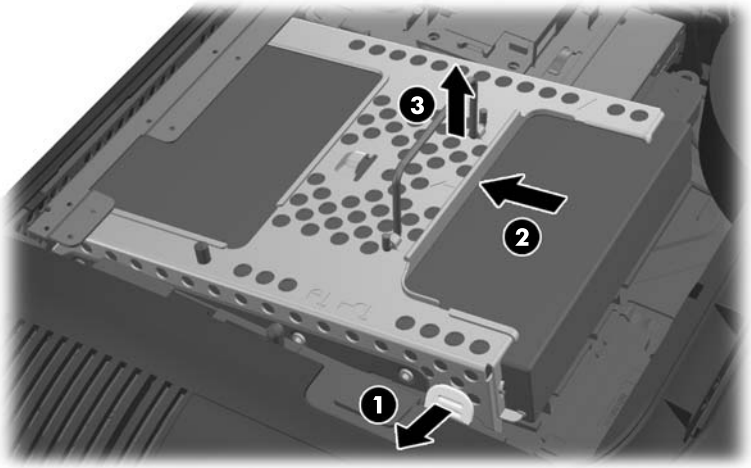
The first hard drive data cable connects to the SATA0 and SATA PWR0 system board connectors.

The second hard drive data cable connects to the SATA1 and SATA PWR1 system board connectors.

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).

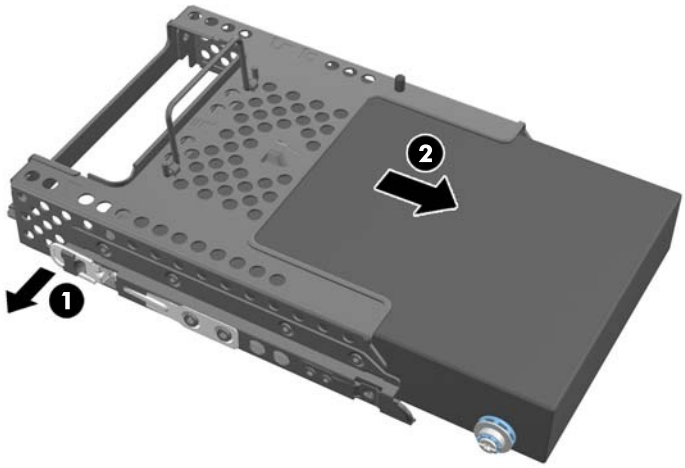
3. Pull the latch next to the lower side of the hard disc drive cage away from the cage to release it, then slide the cage toward the edge of the chassis and lift it out.

Figure 7-17 Removing the hard disc drive cage



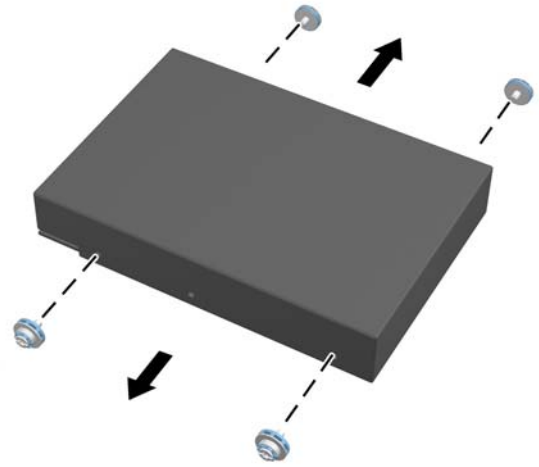
4. Lift the latch on one side of the hard disc drive cage and pull the hard disc drive out of the cage.

Figure 7-18 Removing the hard disc drive from the cage



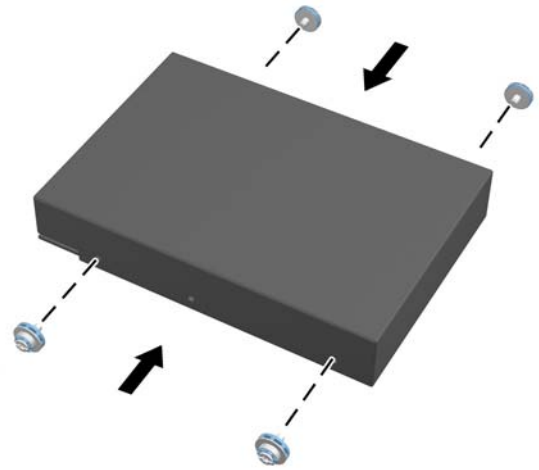
5. Remove the four mounting screws from the hard disc drive. Be sure to keep the blue rubber grommets with each screw.

Figure 7-19 Removing the mounting screws



6. Screw the four mounting screws into the new hard disc drive. Be sure to keep the blue rubber grommets behind each screw.

Figure 7-20 Inserting the mounting screws



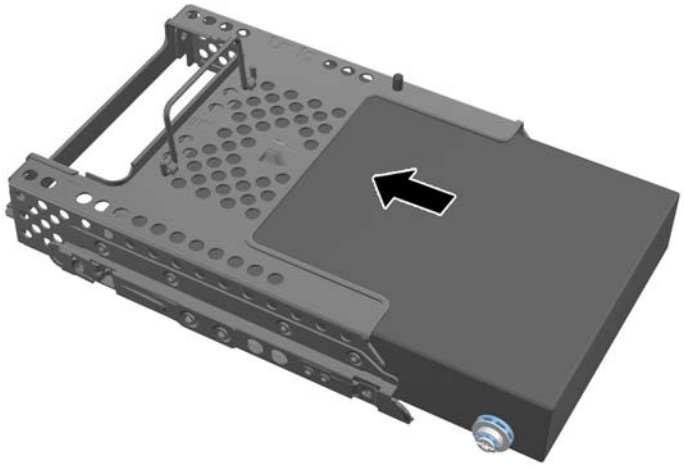
NOTE: If you choose to install an optional 2.5-inch solid state drive (SSD) or self-encrypting drive (SED), you must

1. mount the drive in a drive adapter

2. screw the four mounting screws into the drive adapter

7. Slide the new hard disc drive, or drive adapter bracket holding an optional 2.5-inch drive, into the cage until it snaps in place. Be sure that the connector on the hard disc drive is at the opening of the cage.

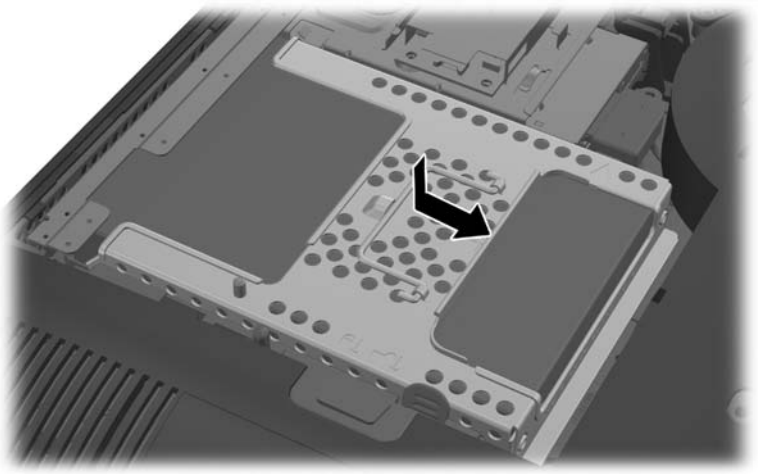
Figure 7-21 Inserting the hard disc drive into the cage



8. With the hard disc drive connector facing toward the center of the chassis, place the hard disc drive cage into the chassis and slide it toward the center until it snaps firmly into place.

NOTE: Make sure the hard drive is firmly seated in the connector. Failure to completely seat the hard drive may result in the inability to install the access panel, as well as disk errors when booting the computer.

Figure 7-22 Installing the hard disc drive cage



9. To replace the access panel, set the panel on the back of the computer, slightly above the stand, and slide it down into place.
10. Reconnect the power cord and external devices.
11. Lock any security devices that were disengaged when the access panel was removed.
12. Turn on the computer.

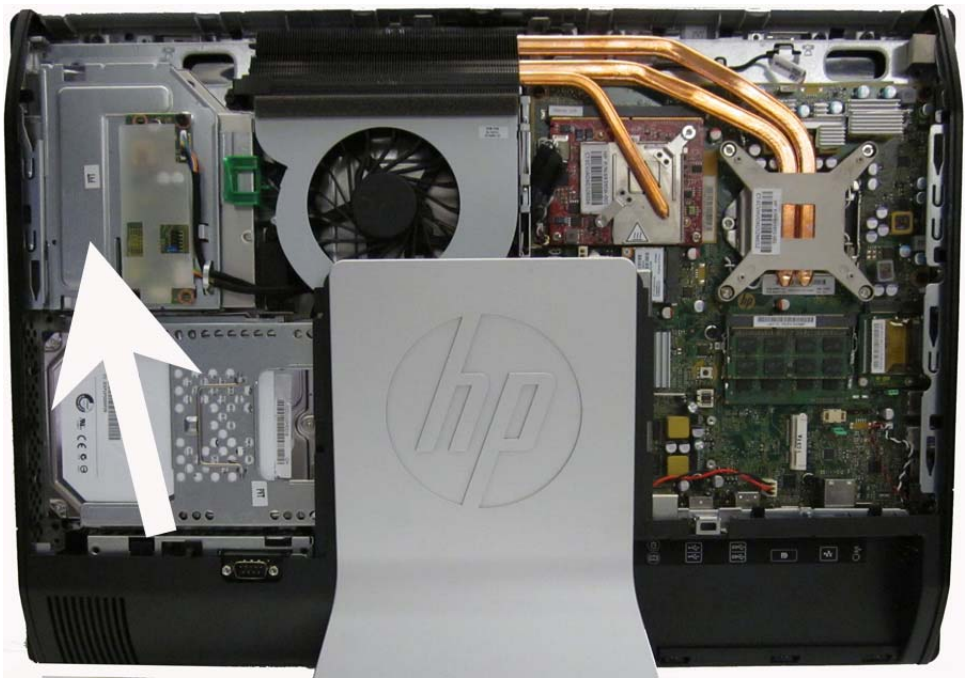
Replacing the optical disc drive

The optical disc drive is located above the hard disc drive on the left side of the computer (when viewed from behind).

The optical drive data cable connects to the SATA2 and SATA PWR2 system board connectors.

NOTE: The drive bracket is not spared. When replacing an optical drive, remove the bracket from the old drive and install it on the new drive.

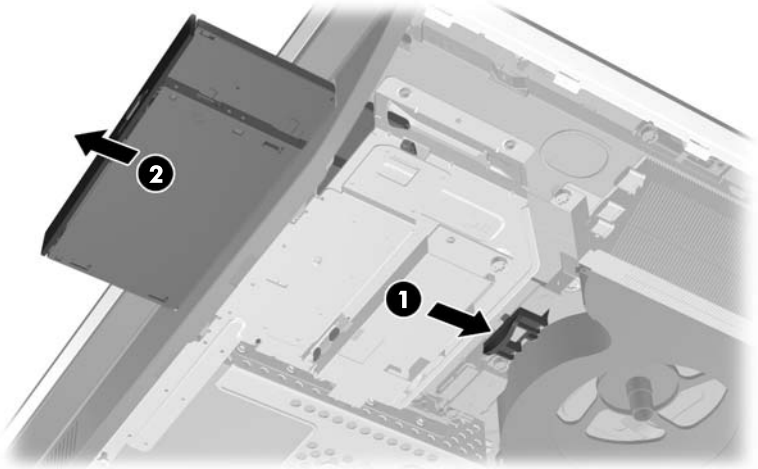
Figure 7-23 Optical drive location



1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).

3. Lift the tab at the back of the optical disc drive enclosure to release the drive.

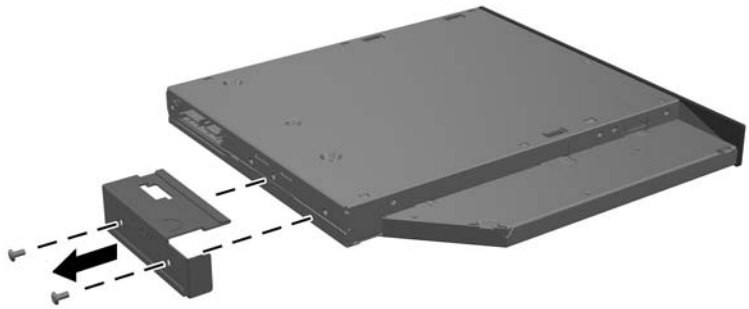
Figure 7-24 Removing the optical disc drive



NOTE: When replacing an optical drive, remove the bracket from the old drive and install it on the new drive. The bracket is not spared.

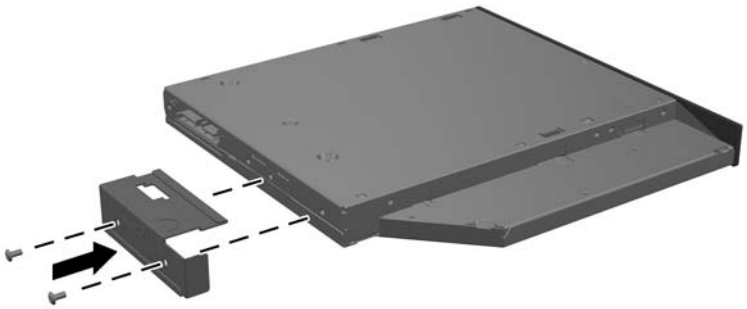
4. Remove the two screws securing the optical disc drive bracket to the drive.

Figure 7-25 Removing the optical disc drive bracket



5. Secure the optical disc drive bracket to the new drive with the two screws.

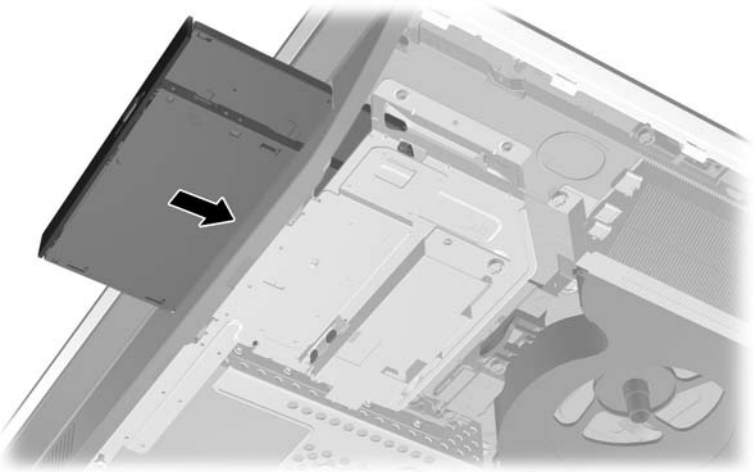
Figure 7-26 Attaching the optical disc drive bracket



6. Align the new optical disc drive with the opening in the side of the computer. Push the drive in firmly until it snaps into place.

NOTE: The optical disc drive can be installed in only one way.

Figure 7-27 Installing the optical disc drive

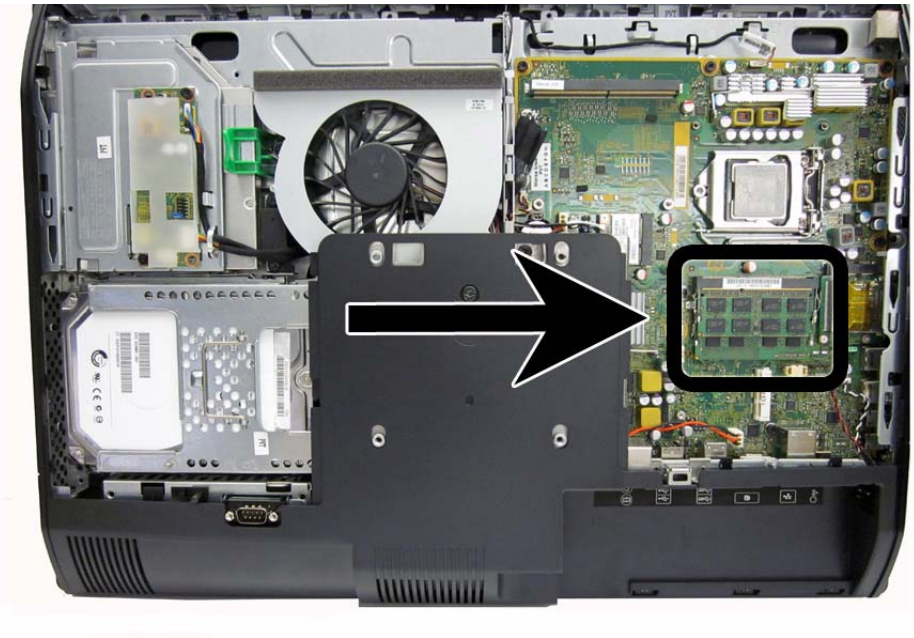


7. To replace the access panel, set the panel on the back of the computer, slightly above the stand, and slide it down into place.
8. Reconnect the power cord and external devices.
9. Lock any security devices that were disengaged when the access panel was removed.
10. Turn on the computer.

Memory

Memory modules are located on the right side of the computer (viewed from behind). The computer has two memory slots.

Figure 7-28 Memory module location



For proper system operation, the SODIMMs must be:

- industry-standard 204-pin
- unbuffered non-ECC PC3-10600 DDR3-1600 MHz-compliant
- 1.5 volt DDR3-SDRAM SODIMMs

The DDR3-SDRAM SODIMMs must also:

- support CAS latency 11 DDR3 1600 MHz (11-11-11 timing)
- contain the mandatory Joint Electronic Device Engineering Council (JEDEC) specification

In addition, the computer supports:

- 1-Gbit, 2-Gbit, and 4-Gbit non-ECC memory technologies
- single-sided and double-sided SODIMMS
- SODIMMs constructed with x8 and x16 SDRAMs; SODIMMs constructed with x4 SDRAMs are not supported

NOTE: The system will not operate properly if you install unsupported SODIMM memory.

The system will automatically operate in single channel mode, dual channel mode, or flex mode, depending on how the SODIMMs are installed. Refer to the following table to identify the SODIMM channel locations.

Table 7-1 Identifying SODIMM locations

Location	System Board Label	Channel
Lower Socket	SODIMM1	Channel A
Upper Socket	SODIMM3	Channel B

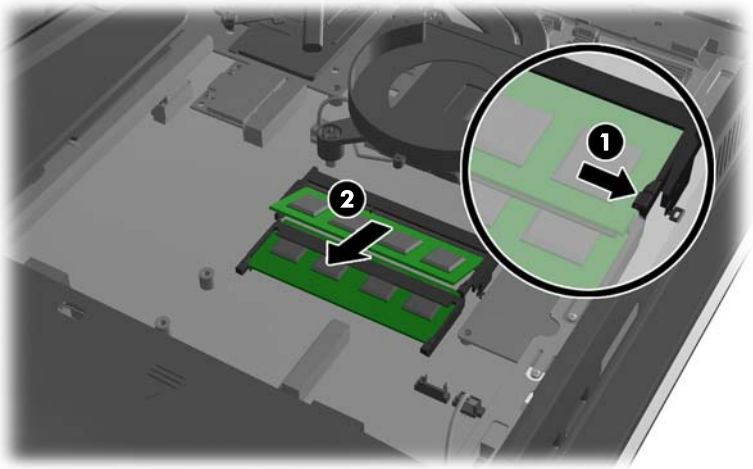
- The system will operate in single channel mode if the SODIMM sockets are populated in one channel only.
- The system will operate in flex mode if the memory capacity of the SODIMM in Channel A is not equal to the memory capacity of the SODIMM in Channel B. In flex mode, the channel populated with the least amount of memory describes the total amount of memory assigned to dual channel and the remainder is assigned to single channel. If one channel will have more memory than the other, the larger amount should be assigned to channel A.
- The system will operate in a higher-performing dual channel mode if the memory capacity of the SODIMM in Channel A is equal to the memory capacity of the SODIMM in Channel B.
- In any mode, the maximum operational speed is determined by the slowest SODIMM in the system.

There are two memory sockets on the system board located behind the memory access panel. To remove or install memory modules:

To remove a memory module:

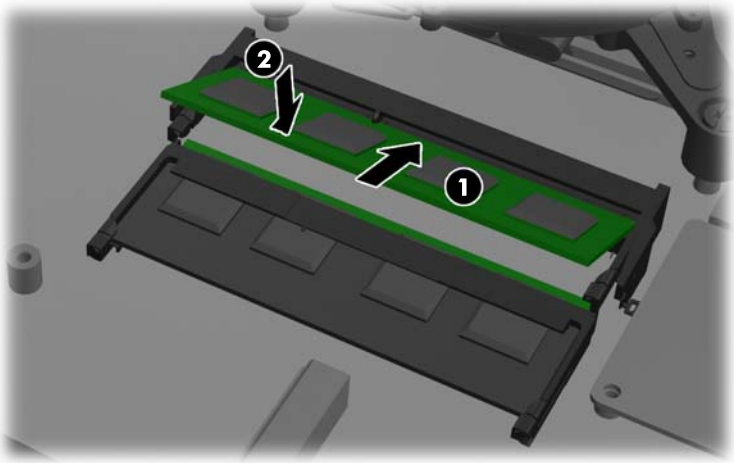
1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Place the computer face down on a soft flat surface. HP recommends that you set down a blanket, towel, or other soft cloth to protect the screen surface from scratches or other damage.
3. Remove the access panel (see Access panel on page 42).
4. To remove a memory module, press outward on the two latches on each side of the SODIMM **(1)**, then pull the SODIMM out of the socket **(2)**.

Figure 7-29 Removing a memory module



5. To install a memory module, slide the SODIMM into the socket at approximately a 30° angle **(1)**, then press the SODIMM down **(2)** so that the latches lock it in place.

Figure 7-30 Installing a memory module



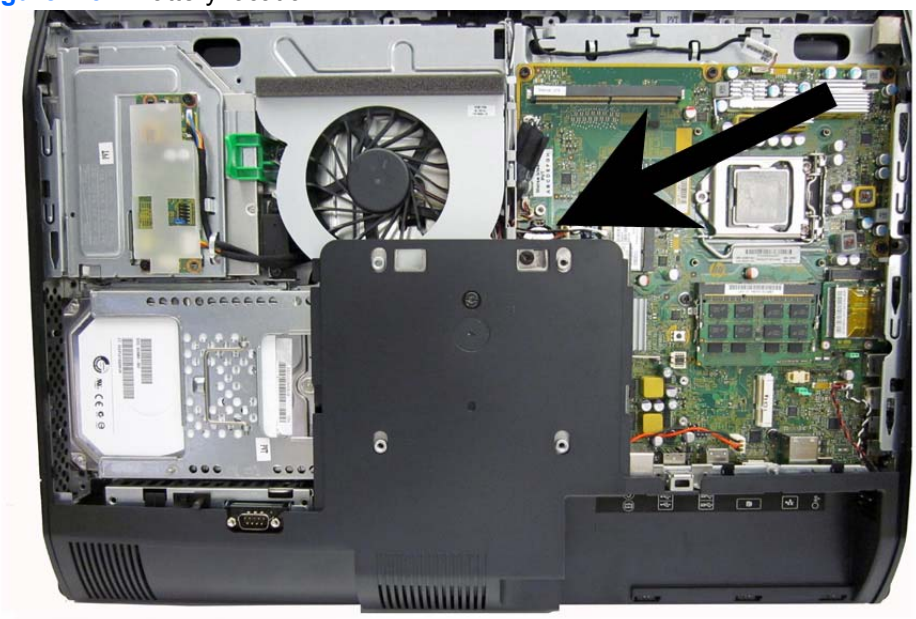
NOTE: A memory module can be installed in only one way. Match the notch on the module with the tab on the memory socket.

The computer automatically recognizes the additional memory when you turn on the computer.

Replacing the battery

The RTC battery is located near the memory modules under the memory access panel.

Figure 7-31 Battery location



The battery is located in the memory compartment. The battery that comes with the computer provides power to the real-time clock. When replacing the battery, use a battery equivalent to the battery originally installed in the computer. The computer comes with a 3-volt lithium coin cell battery.

⚠ **WARNING!** The computer contains an internal lithium manganese dioxide battery. There is a risk of fire and burns if the battery is not handled properly. To reduce the risk of personal injury:

Do not attempt to recharge the battery.

Do not expose to temperatures higher than 60° C (140º F).

Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.

Replace the battery only with the HP spare designated for this product.

⚠ **CAUTION:** Before replacing the battery, it is important to back up the computer CMOS settings. When the battery is removed or replaced, the CMOS settings will be cleared.

Static electricity can damage the electronic components of the computer or optional equipment. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object.

NOTE: The lifetime of the lithium battery can be extended by plugging the computer into a live AC wall socket. The lithium battery is only used when the computer is NOT connected to AC power.

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, go to http://www.hp.com/recycle.

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).

2. Remove the access panel (see Access panel on page 42).

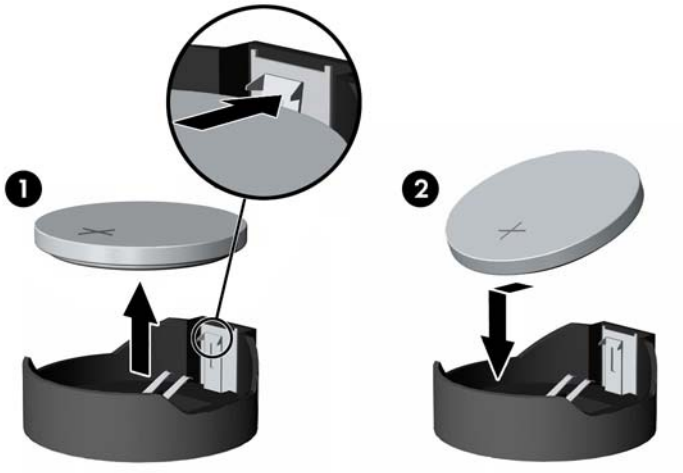
   The battery can now be seen on the lower right side of the fan.

   Figure 7-32 Locating the battery

3. To release the battery from its holder, squeeze the metal clamp that extends above one edge of the battery. When the battery pops up, lift it out **(1)**.

4. To insert the new battery, slide one edge of the replacement battery under the holder's lip with the positive side up. Push the other edge down until the clamp snaps over the other edge of the battery **(2)**.

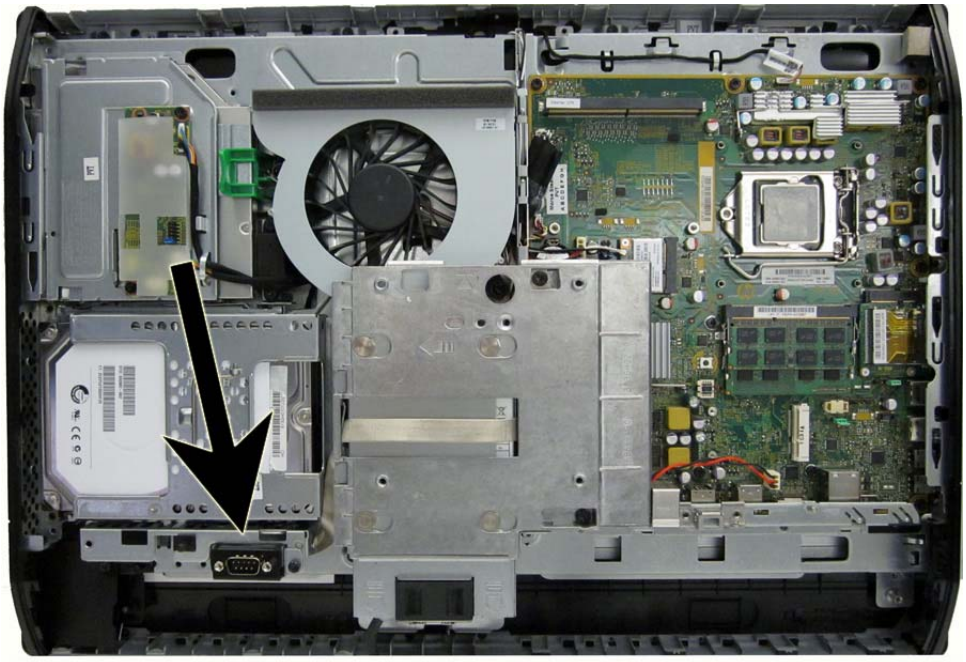
   Figure 7-33 Removing and Replacing a coin cell battery (Type 2)



Serial port

The serial port is located near the bottom of the computer below the hard drive. It is secured with one Phillips screw.

Figure 7-34 Serial port location

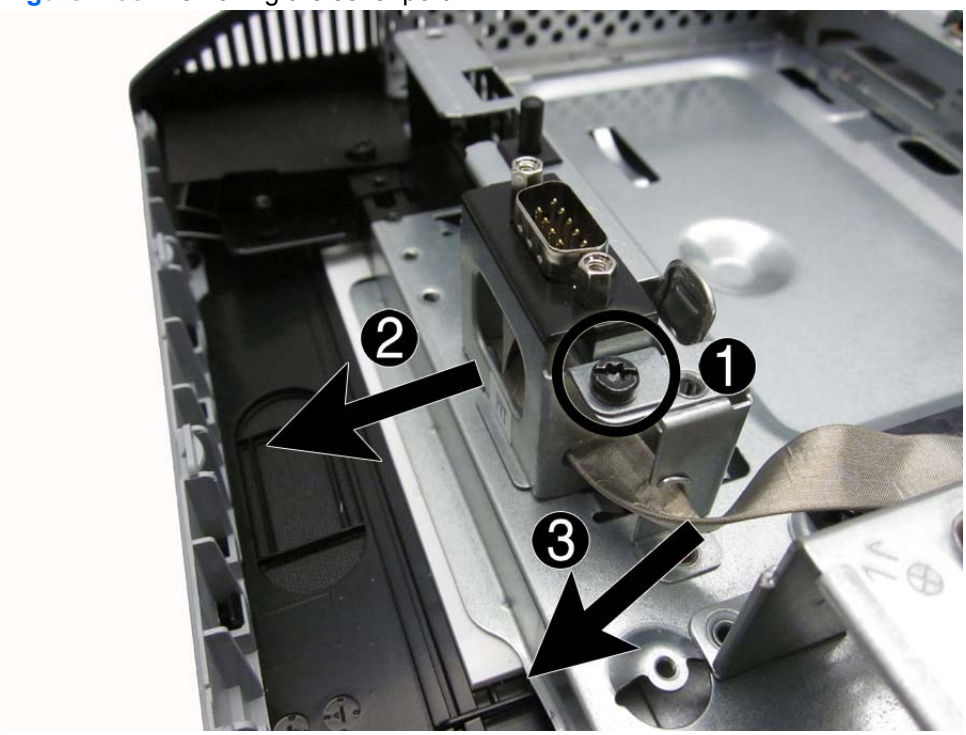


To remove the serial port:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the lower panel (see Lower panel on page 46).
4. Remove the Phillips screw **(1)** that secures the port to the computer.
5. Slide the bottom of the port assembly to remove it from the tab in the computer **(2)**.

6. Remove the cable from its routing path **(3)**, and remove the serial port assembly from the computer.

Figure 7-35 Removing the serial port



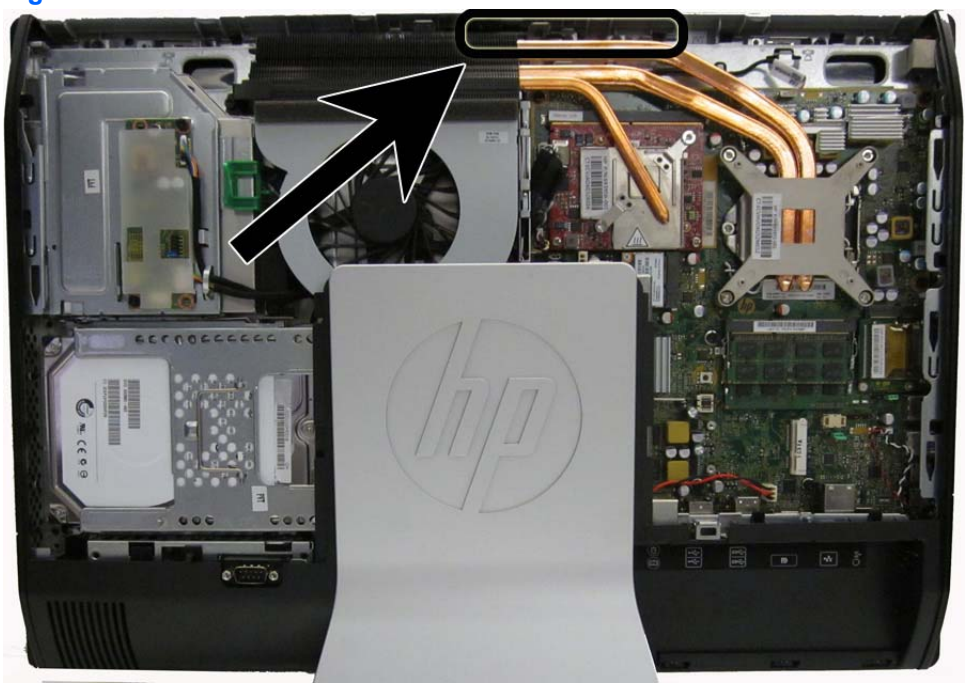
To install the serial port, reverse the removal procedures.

Webcam module

On products that ship with a webcam module, the module is located at the top of the computer beneath the top panel. It is secured with two silver Phillips screws and has one connector.

The webcam module is optional.

Figure 7-36 Webcam module location

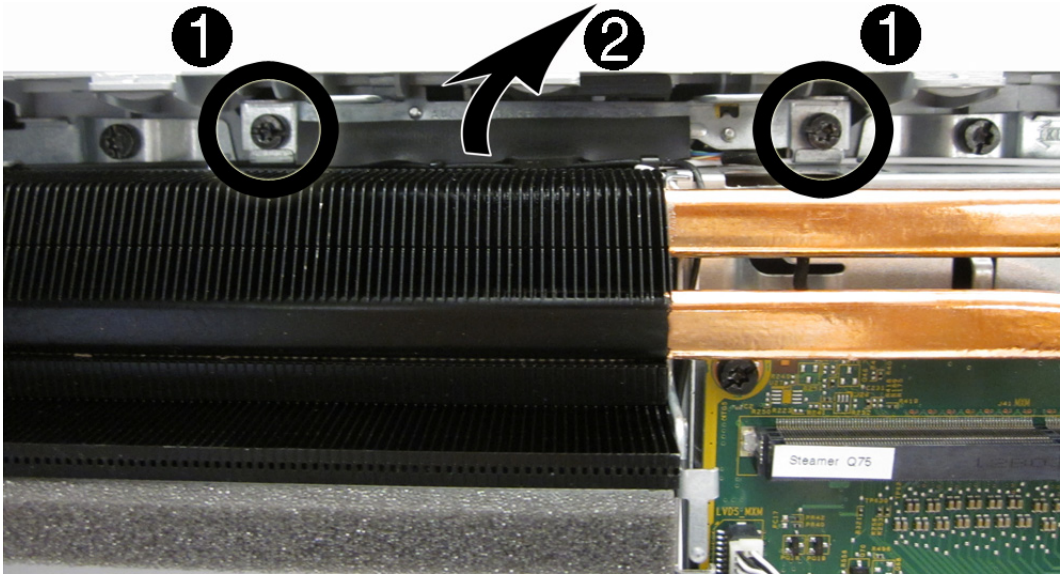


To remove the webcam module:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).

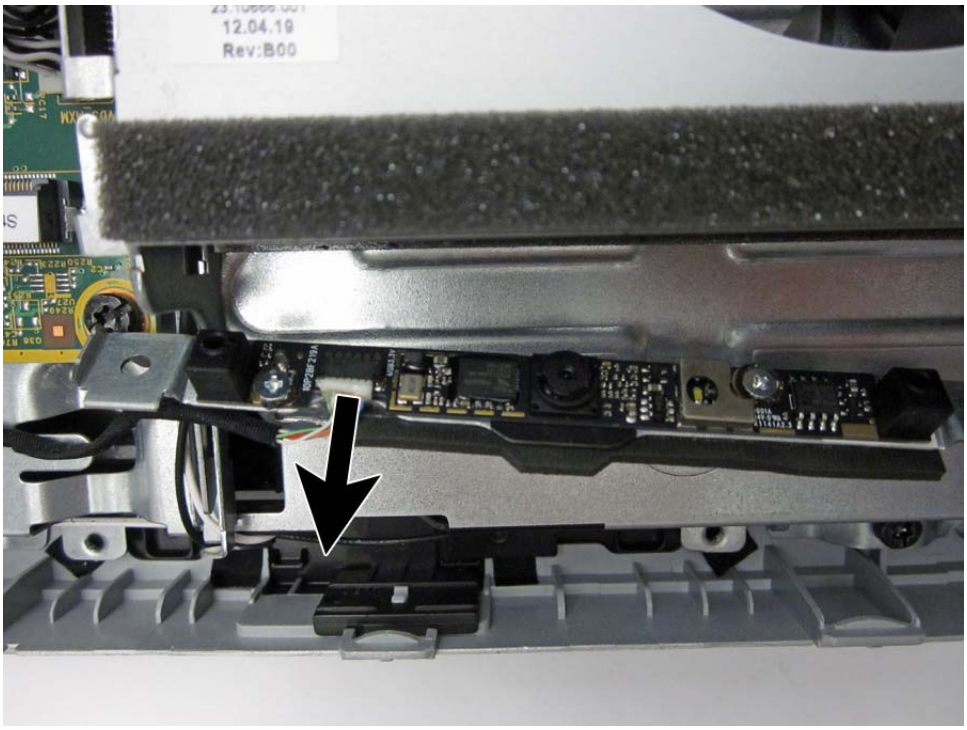
3. Remove the two Torx screws that secure the webcam module bracket to the computer.

Figure 7-37 Removing the webcam module



4. Rotate the assembly to gain access to the connector on the module, and then disconnect the cable from the module.

Figure 7-38 Disconnecting the webcam module cable



5. To remove the module from the bracket, remove the two Phillips screws that secure the module, and then separate the module from the bracket.

Figure 7-39 Disconnecting the webcam module cable

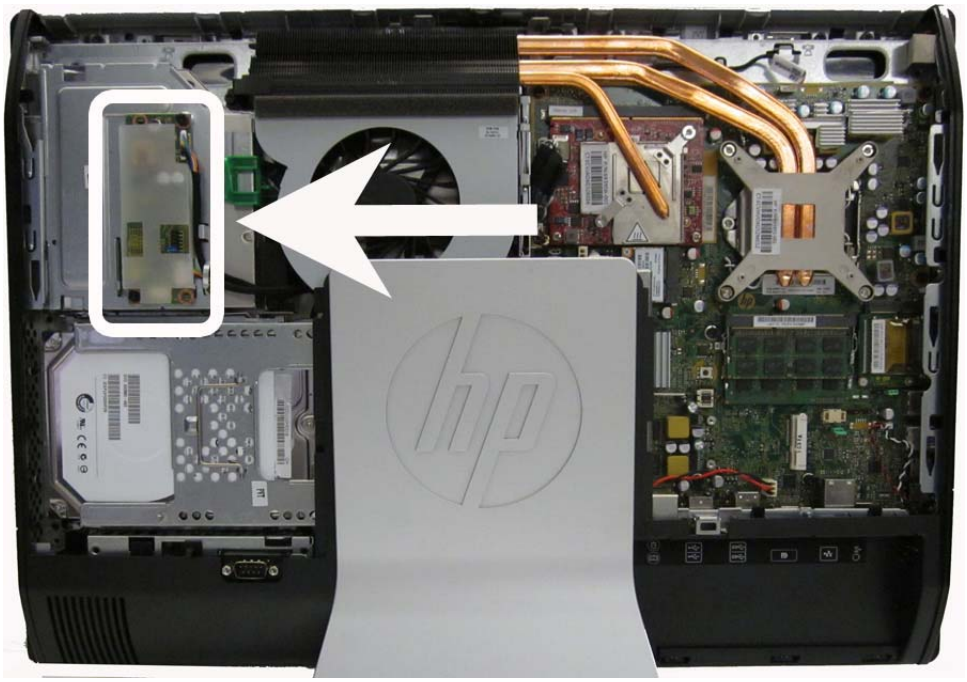
To install a webcam module, reverse the removal procedures.

Converter board

The converter board is located on the left side of the computer (viewed from behind) under the main rear cover. It is secured with two Torx screws and has two connectors.

Use the same converter spare part for all display panels; however, you must change jumper settings on the board based on the display panel.

Figure 7-40 Converter board location



To remove the converter board:

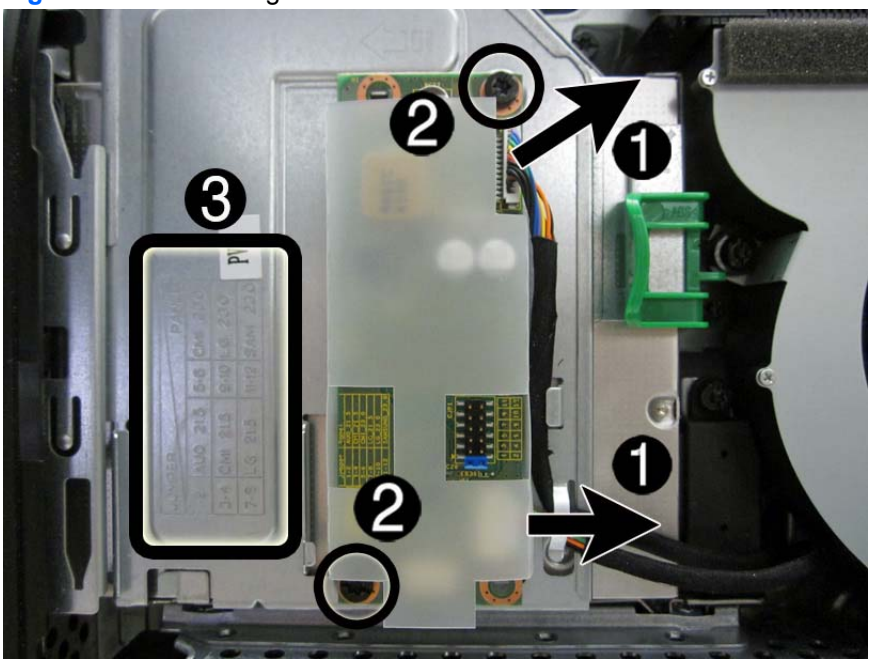
1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Disconnect the two cables from the board **(1)**.

NOTE: Be careful not to damage the cables when disconnecting them from the board. Do not pull on the wires.

4. Remove the two black Torx screws **(2)** that secure the board to the computer.

   Note the converter board jumper settings stamped on the chassis **(3)**. Be sure to correctly position the jumpers on the converter board for the installed display panel.

   Figure 7-41 Removing the converter board



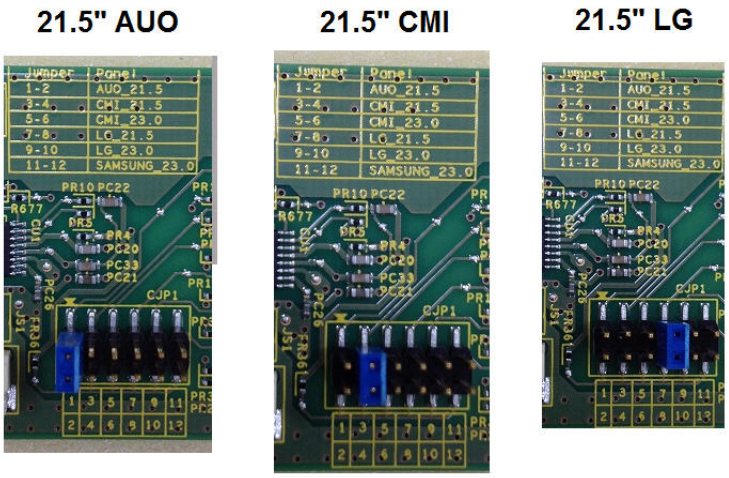
5. Lift the converter board from the computer.

   Be sure to correctly position the jumpers on the converter board for the installed display panel, as follows:

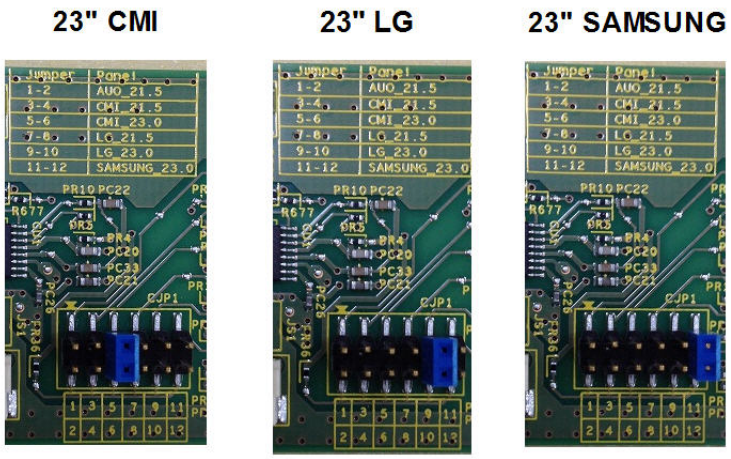
⚠ **CAUTION:** Incorrect jumper placement can result in damage to the converter board and display panel.

- 21.5-inch panel
  - AUO panel: pins (1)(2)
  - CMI panel: pins (3)(4)
  - LG panel: pins (7)(8)
- 23.0-inch panel
  - CMI panel: pins (5)(6)
  - LG panel: pins (9)(10)
  - Samsung panel: pins (11)(12)

21.5-inch



23.0-inch



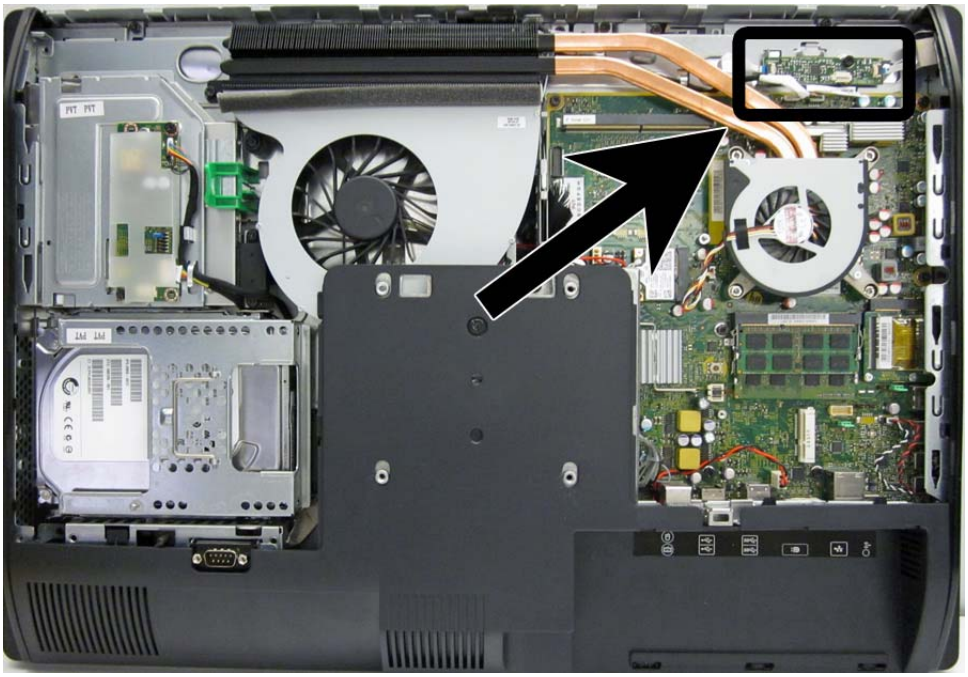
To install the converter board, reverse the removal procedures.

Touch sensor board

NOTE: The touch sensor board is located on the right side of the computer (viewed from behind) above the system board. It is secured with one Torx screw and has three connectors.

Touch sensor boards are spared with the touch panel spare part kit. Be sure to replace the touch sensor board when replacing a touch display panel.

Figure 7-42 Touch sensor board location



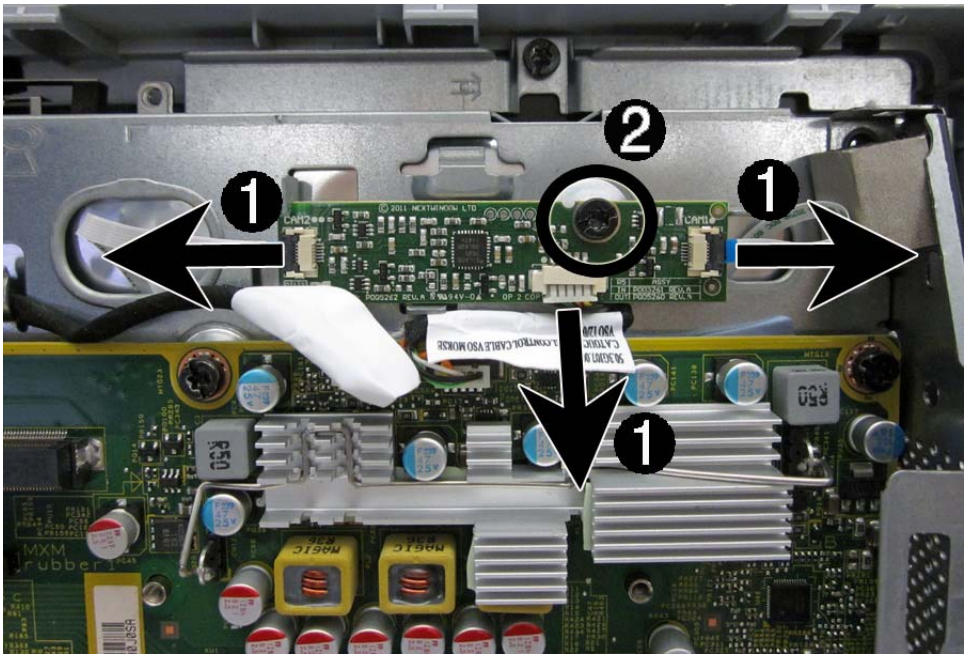
To remove the touch sensor board:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Disconnect the cables from the three connectors on the board **(1)**.

NOTE: Be careful not to damage the cables when disconnecting them from the board. Do not pull on the wires or cables.

4. Remove the Torx screw **(2)** that secures the board to the computer.

Figure 7-43 Removing the touch sensor board



5. Lift the touch sensor board from the computer.

To install the touch sensor board, reverse the removal procedures.

Heat sinks – Graphics board and processor

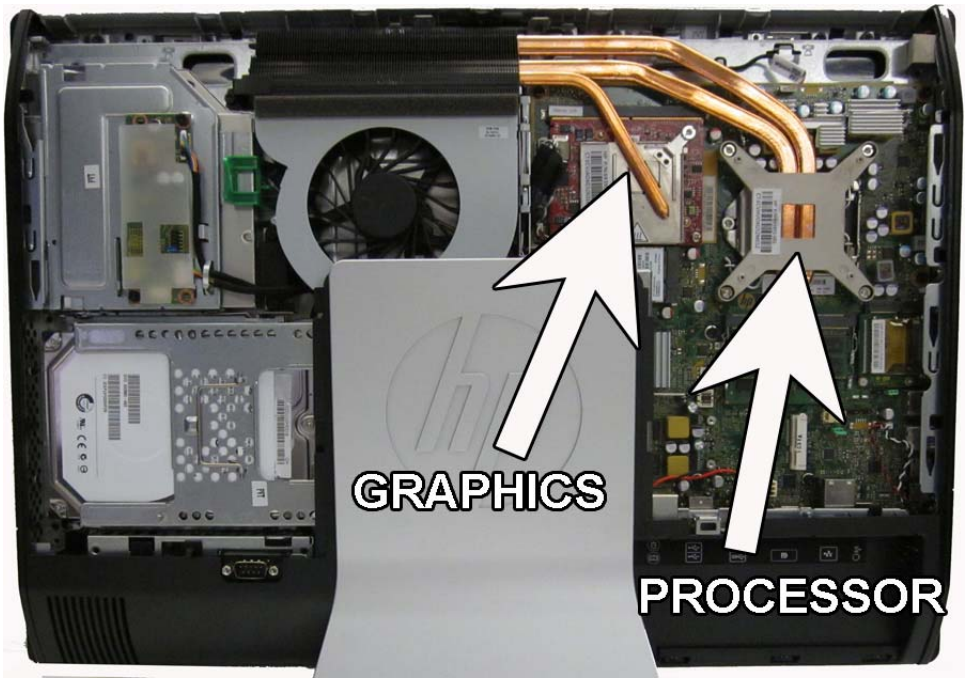
Separate heat sinks cool the discrete graphic board (select models only) and the processor. If installed, you must remove the smaller graphics heat sink before you can remove the larger processor heat sink.

The graphics heat sink is secured with three Torx screws – two captured, one not captured. The heat sinks share the one non-captured screw.

The processor heat sink is secured with five Torx screws – four captured, one shared, not captured.

Model 8300 may include a fan attached to the heat sink.

Figure 7-44 Heat sink locations



Graphics heat sink

To remove the heat sink:

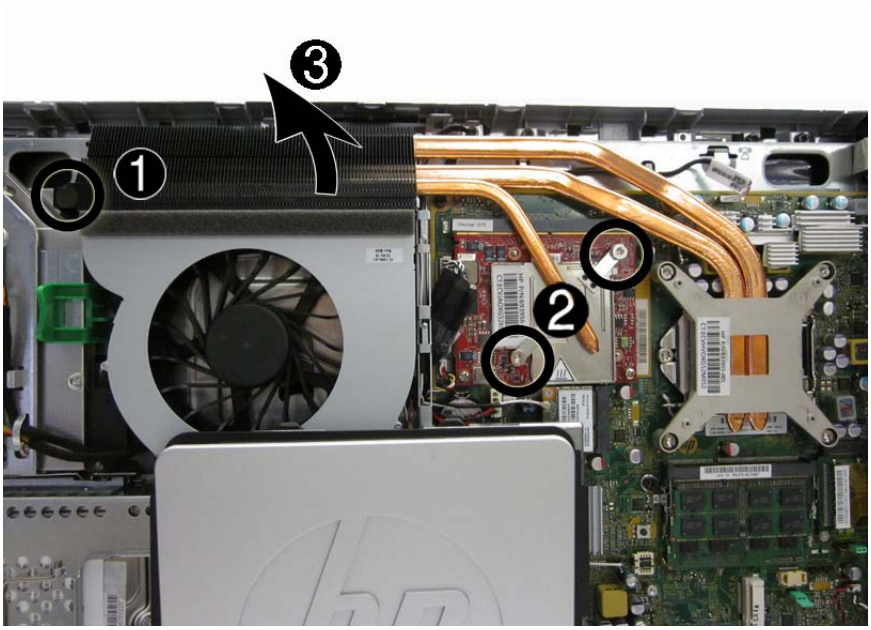
1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the center access panel (see Access panel on page 42).
3. Remove the black Torx screw from the top of the heat sink **(1)**.

4. Loosen the two silver captive Torx screws on the heat sink **(2)**, and then lift the heat sink out of the computer **(3)**.

CAUTION: Remove heat sink retaining screws in diagonally opposite pairs (as in an X) to even the downward forces on the processor. This is especially important as the pins on the socket are very fragile and any damage to them may require replacing the system board.

CAUTION: To reduce a degradation in thermal performance, be sure not to touch the thermal grease on the surface of the processor or the heat sink.

Figure 7-45 Removing the graphics heat sink



To replace the heat sink, reverse the removal procedures.

Processor heat sink – model 6300

To remove the heat sink:

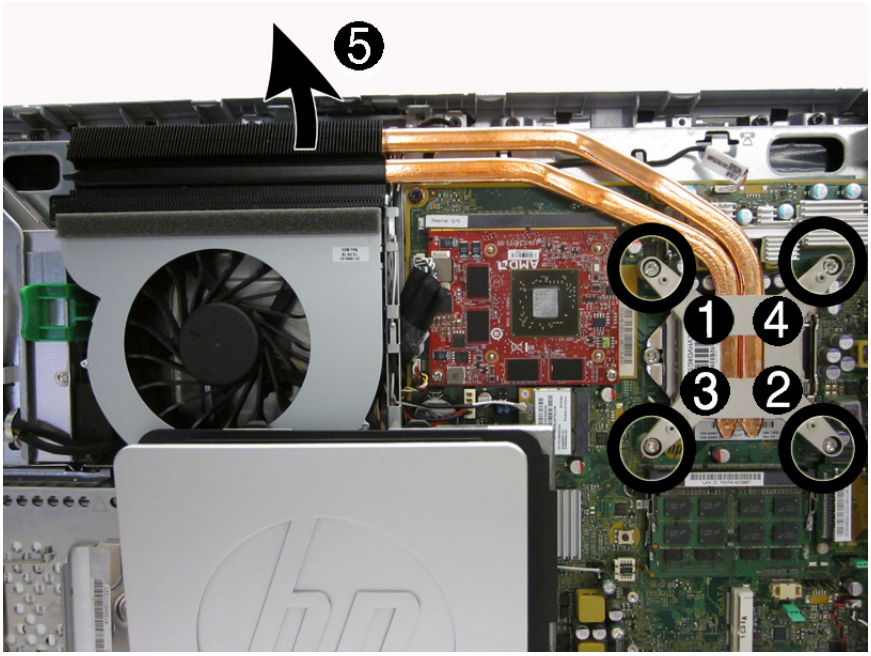
1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the center access panel (see Access panel on page 42).
3. If installed, remove the graphics heat sink (see Graphics heat sink on page 71).

4. In the order indicated on the heat sink, loosen the four silver captive Torx screws **(1)** – **(4)**, and then lift the heat sink out of the computer **(5)**.

CAUTION: Remove heat sink retaining screws in diagonally opposite pairs (as in an X) to even the downward forces on the processor. This is especially important as the pins on the socket are very fragile and any damage to them may require replacing the system board.

CAUTION: To reduce a degradation in thermal performance, be sure not to touch the thermal grease on the surface of the processor or the heat sink.

Figure 7-46 Removing the processor heat sink — 6300 models



To replace the heat sink, reverse the removal procedures.

Processor heat sink – model 8300

To remove the heat sink:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the center access panel (see Access panel on page 42).
3. If installed, remove the graphics heat sink (see Graphics heat sink on page 71).
4. In the order indicated on the heat sink, loosen the four silver captive Torx screws **(1)** – **(4)**, and then lift the heat sink out of the computer **(5)**.

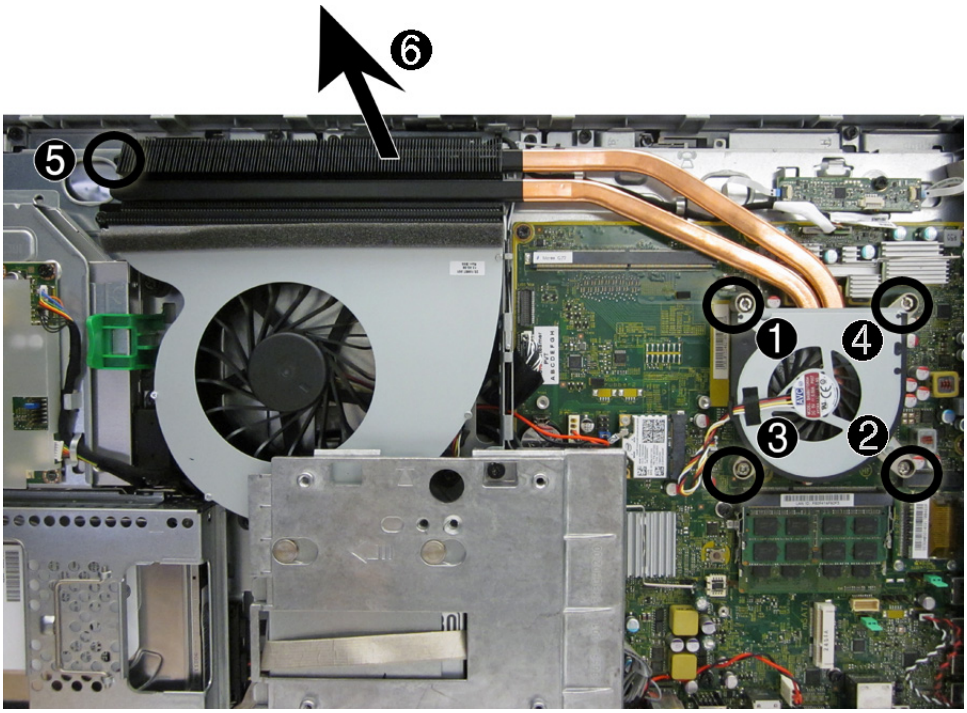
CAUTION: Remove heat sink retaining screws in diagonally opposite pairs (as in an X) to even the downward forces on the processor. This is especially important as the pins on the socket are very fragile and any damage to them may require replacing the system board.

5. Remove the non-captive Torx screw from the top of the heat sink **(5)**.

6. Lift the heat sink assembly from the computer **(6)**.

⚠ **CAUTION:** To reduce a degradation in thermal performance, be sure not to touch the thermal grease on the surface of the processor or the heat sink.

Figure 7-47 Removing the processor heat sink — 8300 models



7. If you need to remove the fan from the heat sink, remove the three small Phillips screws that secure the fan to the heat sink, and lift the fan from the heat sink.

Figure 7-48 Removing the fan from the heat sink

To replace the heat sink, reverse the removal procedures.

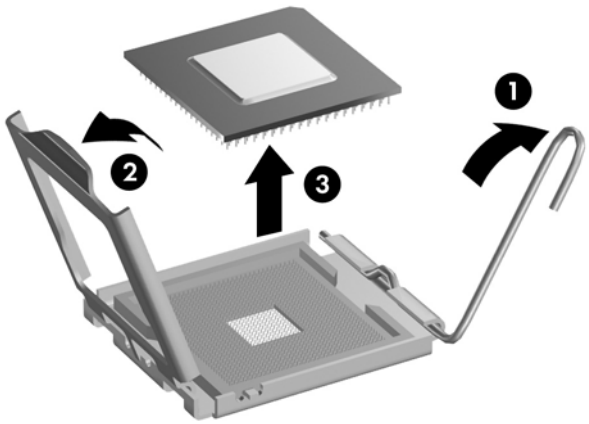
Processor

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the graphics heat sink (see Graphics heat sink on page 71).
4. Remove the processor heat sink (see Processor heat sink – model 6300 on page 72).
5. Rotate the locking lever to its full open position **(1)**.
6. Raise and rotate the microprocessor retainer to its fully open position **(2)**.
7. Carefully lift the processor from the socket **(3)**.

CAUTION: Do NOT handle the pins in the processor socket. These pins are very fragile and handling them could cause irreparable damage. Once pins are damaged it may be necessary to replace the system board.

The heat sink must be installed within 24 hours of installing the processor to prevent damage to the processor's solder connections.

Figure 7-49 Removing the processor



To install a new processor:

1. Place the processor in its socket and close the retainer. Make sure the slot in the processor fits into the post on the socket.
2. Secure the locking lever. If reusing the existing heat sink, go to step 3. If using a new heat sink, go to step 6.

3. If reusing the existing fan sink, clean the bottom of the fan sink with the alcohol pad provided in the spares kit.

   CAUTION: Before reinstalling the fan sink you must clean the top of the processor and the bottom of the fan sink with an alcohol pad supplied in the spares kit. After the alcohol has evaporated, apply thermal grease to the top of the processor from the syringe supplied in the spares kit.

4. Apply the thermal grease provided in the spares kit to the top of the processor and install the fan sink atop the processor.

5. Go to step 7.

6. If using a new fan sink, remove the protective covering from the bottom of the fan sink and place it in position atop the processor.

7. Secure the fan sink to the system board and system board tray.

   CAUTION: Fan sink retaining screws should be tightened in diagonally opposite pairs (as in an X) to evenly seat the fan sink on the processor. This is especially important as the pins on the socket are very fragile and any damage to them may require replacing the system board.

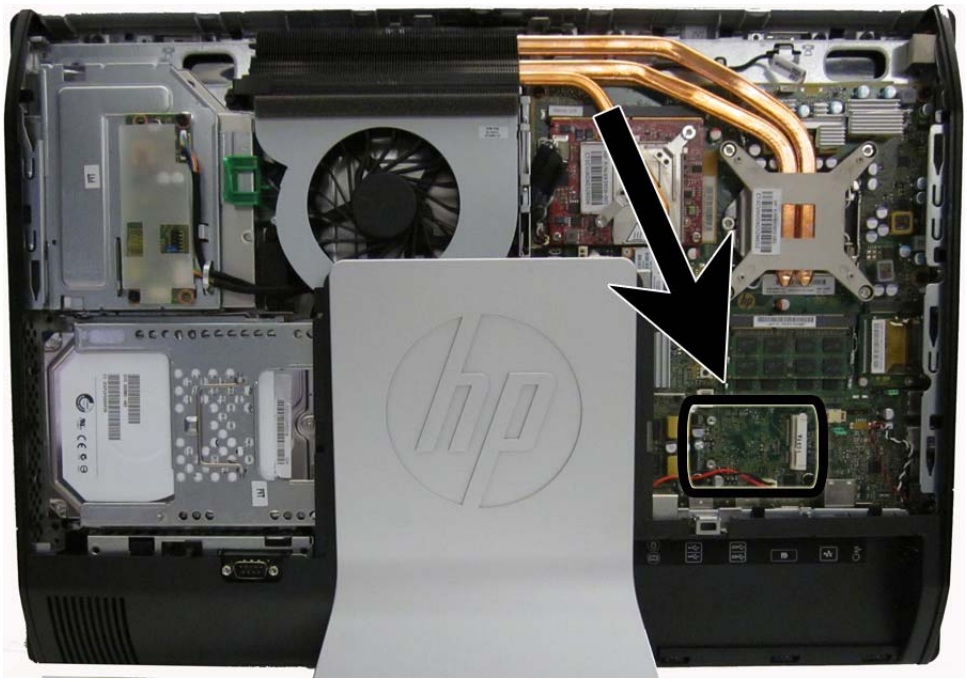
NOTE: After installing a new processor onto the system board, always update the system ROM to ensure that the latest version of the BIOS is being used on the computer. The latest system BIOS can be found on the Web at: http://h18000.www.hp.com/support.

mSATA Solid-State Drive

The mSATA SSD is located on the bottom of the system board. The drive is secured with two Phillips screws.

NOTE: In the following image, the mSATA SSD is not shown.

Figure 7-50 mSATA SSD location



To remove the mSATA SSD:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the two Phillips screws that secure the SSD to the computer.
4. Lift the SSD to a 45-degree angle, and then pull it away to remove it from the socket.

To install the mSATA SSD, reverse the removal procedures.

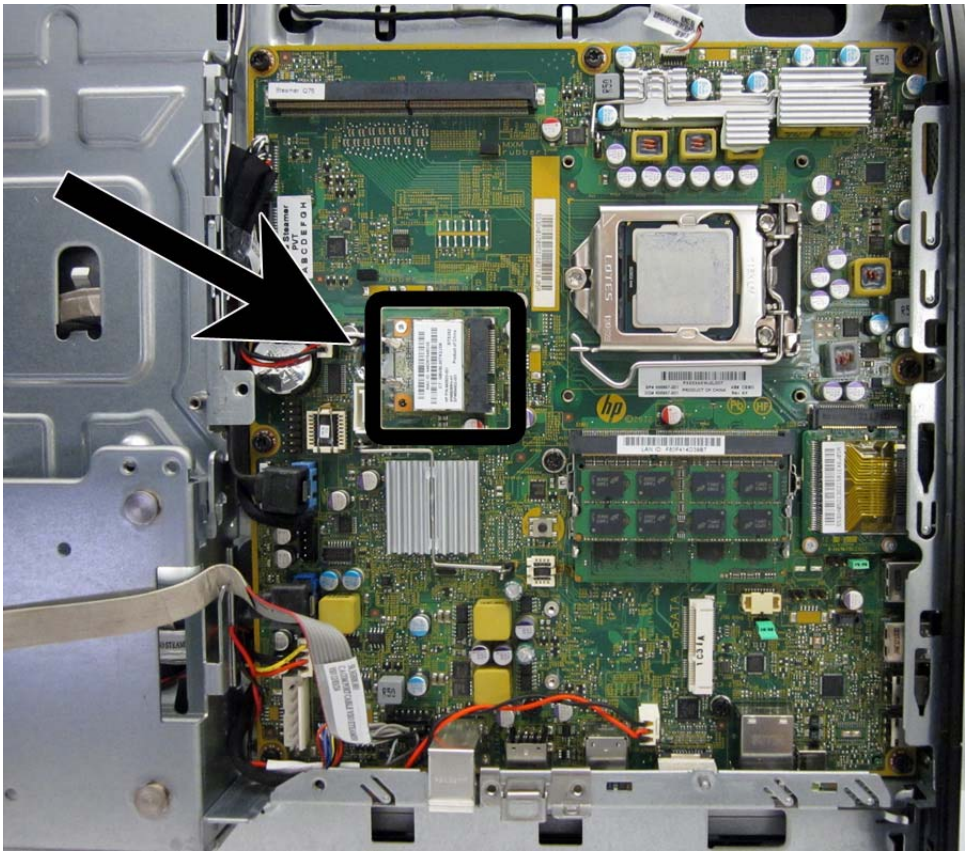
NOTE: mSATA SSD are designed with a notch to prevent incorrect insertion.

WLAN module

The WLAN module is located on the left side of the system board. The module is secured with one Phillips screw and has two connected antennas.

NOTE: The procedure to replace the WLAN module must be performed by an HP technician.

Figure 7-51 WLAN module location

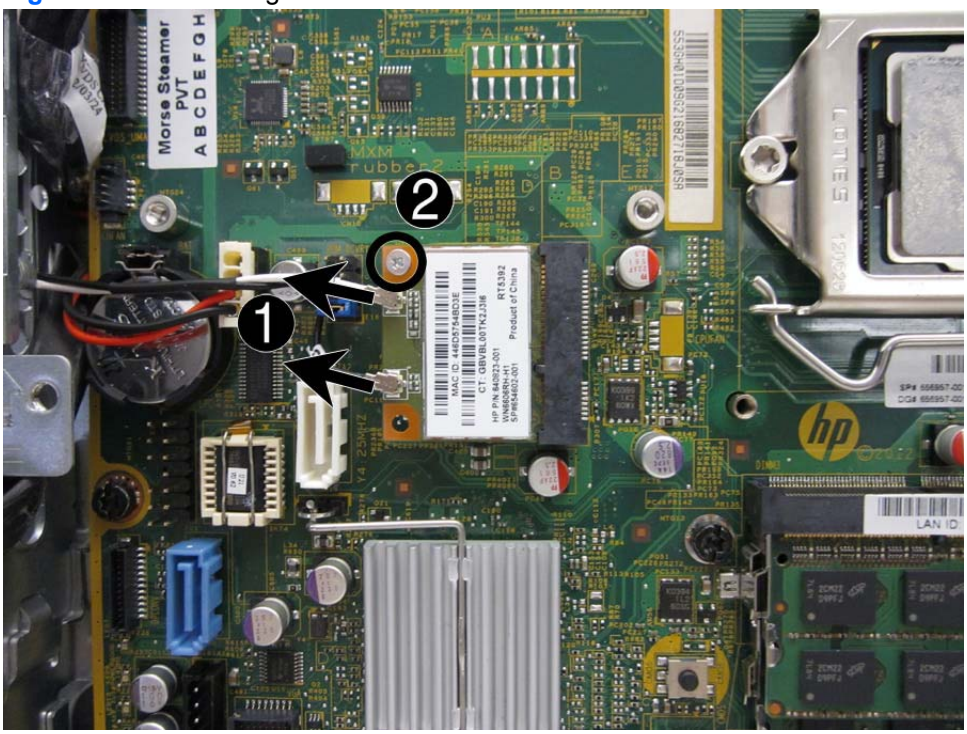


To remove the WLAN module:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the stand (see Stand on page 44).

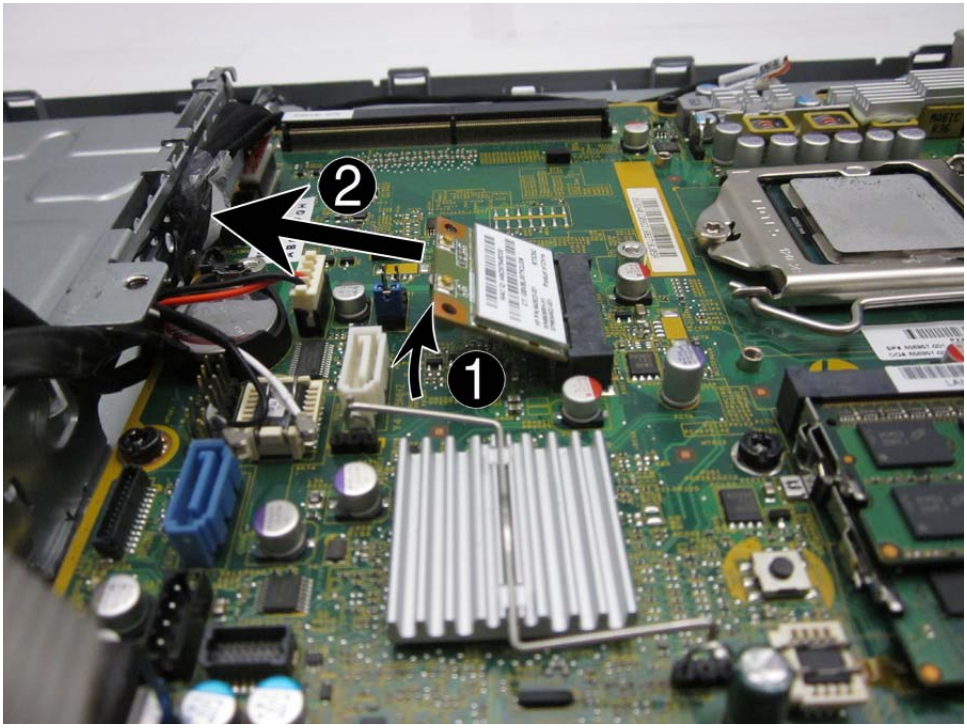
4. Remove the lower panel (see Lower panel on page 46).
5. Remove the metal plate (see Metal plate on page 47).
6. Disconnect the antenna cables from the module **(1)**.
7. Remove the Phillips screw **(2)** that secures the module to the computer.

Figure 7-52 Removing the WLAN module screw and antennas



8. Lift the module to a 45-degree angle **(1)**, and then pull it away to remove it from the socket **(2)**.

Figure 7-53 Removing the WLAN module



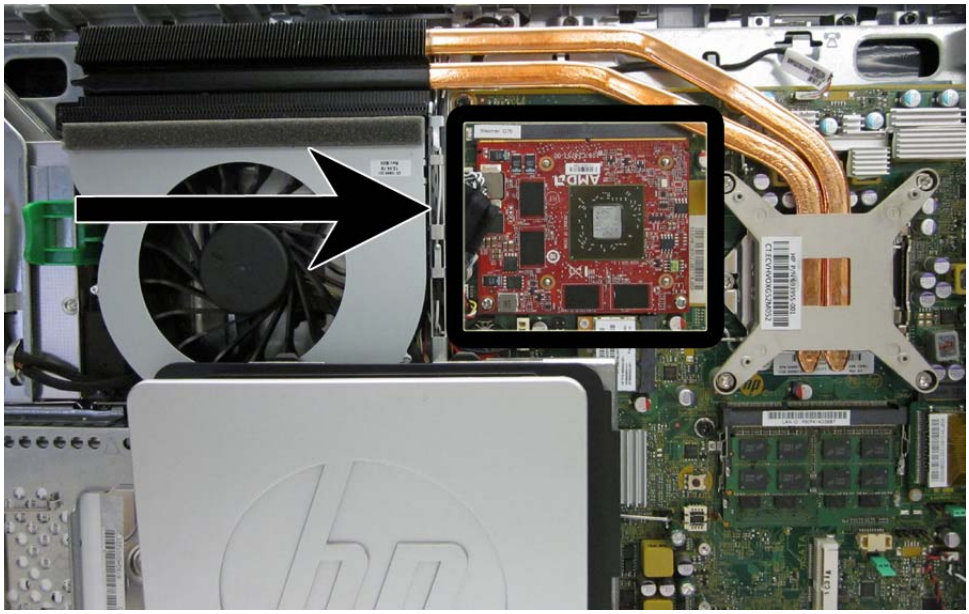
To install the WLAN module, reverse the removal procedures.

NOTE: WLAN modules are designed with a notch to prevent incorrect insertion.

Graphics board

The graphics board is secured with two Torx screws. Removing it allows access to the webcam and allows you to remove the main rear cover.

Figure 7-54 Graphics board location

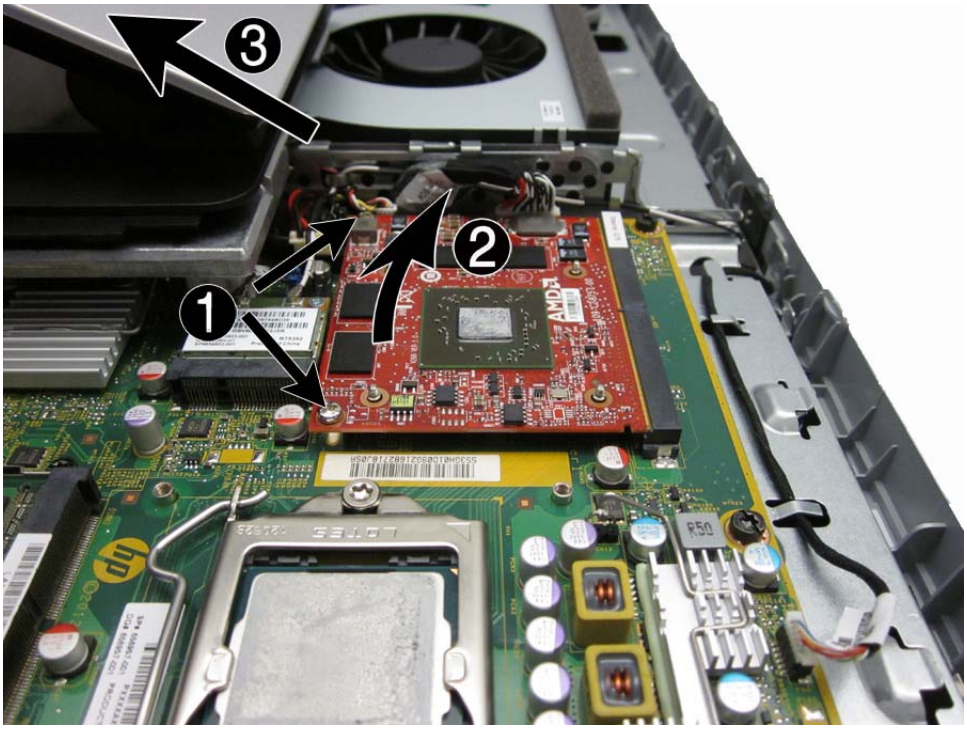


To remove the graphics board:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the graphics heat sink (see Graphics heat sink on page 71).
4. Remove the two Phillips screws **(1)** that secure the board to the system board.

5. Rotate the board upward **(2)**, and then pull it up and away from the connector to remove it from the computer **(3)**.

Figure 7-55 Removing the graphics board



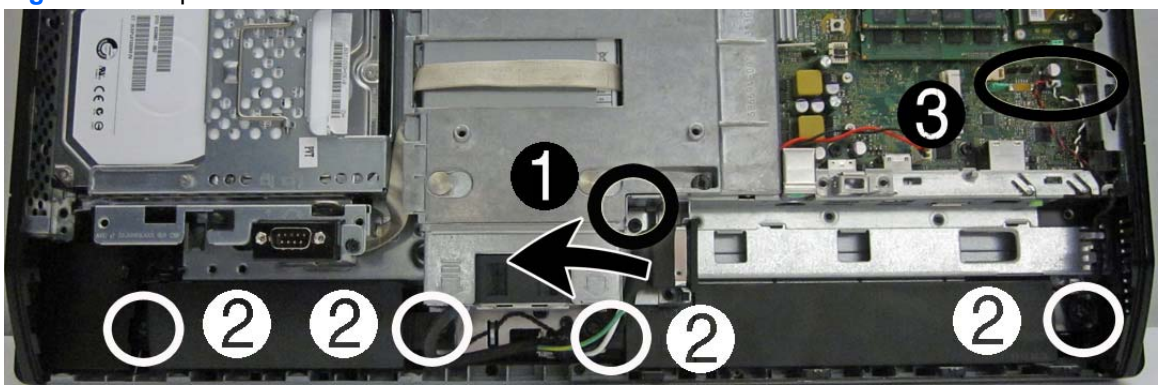
To replace the graphics board, reverse the removal procedures.

Speakers

On products that ship with speakers, the speakers are located at the bottom of the computer. Two separate speakers are each secured by two Torx screws. To remove the right speaker you have to remove the power supply plug.

Speakers are optional.

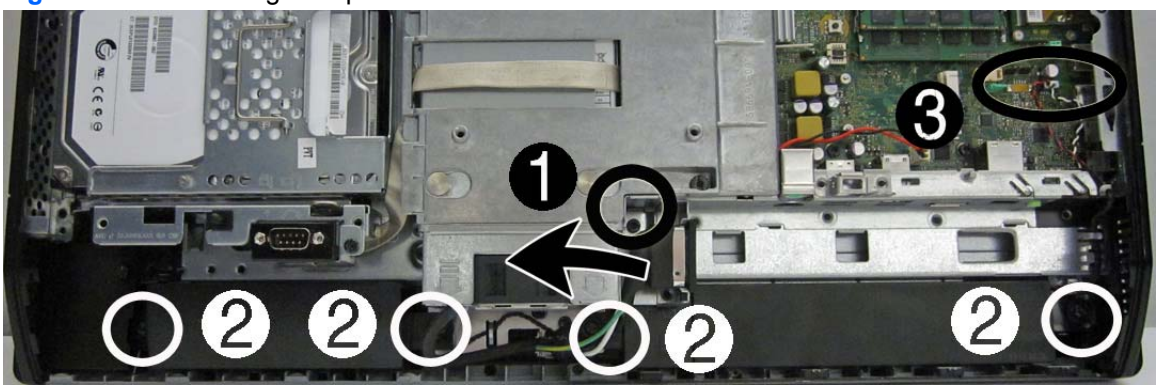
Figure 7-56 Speaker location



To remove the speakers:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the stand (see Stand on page 44).
4. Remove the lower panel (see Lower panel on page 46).
5. Remove Torx screw that secures the power connector to the computer, and lift the connector from its position on top of the left speaker **(1)**.
6. Remove two Torx screws **(2)** that secure each speaker to the computer.
7. Disconnect the speaker cables from the system board connector labeled SPKR**(3)**.

Figure 7-57 Removing the speakers



8. Remove the speakers from the computer.

To install the speakers, reverse the removal procedures.

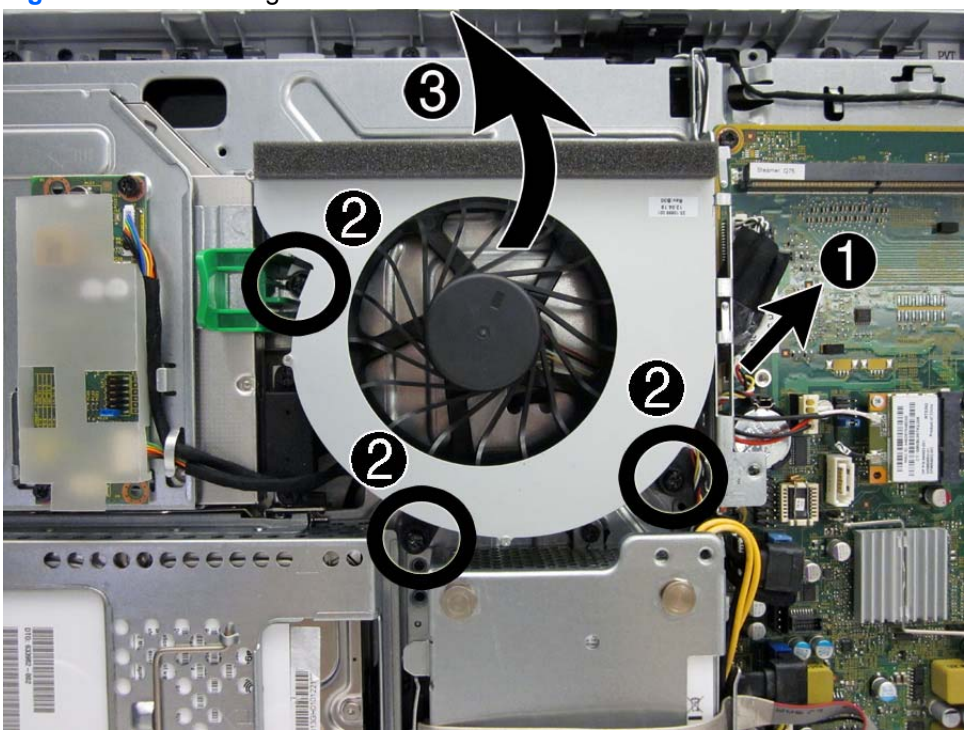
Fan

The fan is located near the middle of the computer and is secured with three Torx screws. You have to remove the metal plate to remove the fan..

To remove the fan assembly:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the stand (see Stand on page 44).
4. Remove the lower panel (see Lower panel on page 46).
5. Remove the metal plate (see Metal plate on page 47).
6. Disconnect the fan cable from the system board connector labeled CHFAN **(1)**.
7. Remove the three Torx screws that secure the fan to the computer **(2)**.
8. Remove the fan from the computer **(3)**.

Figure 7-58 Removing the fan



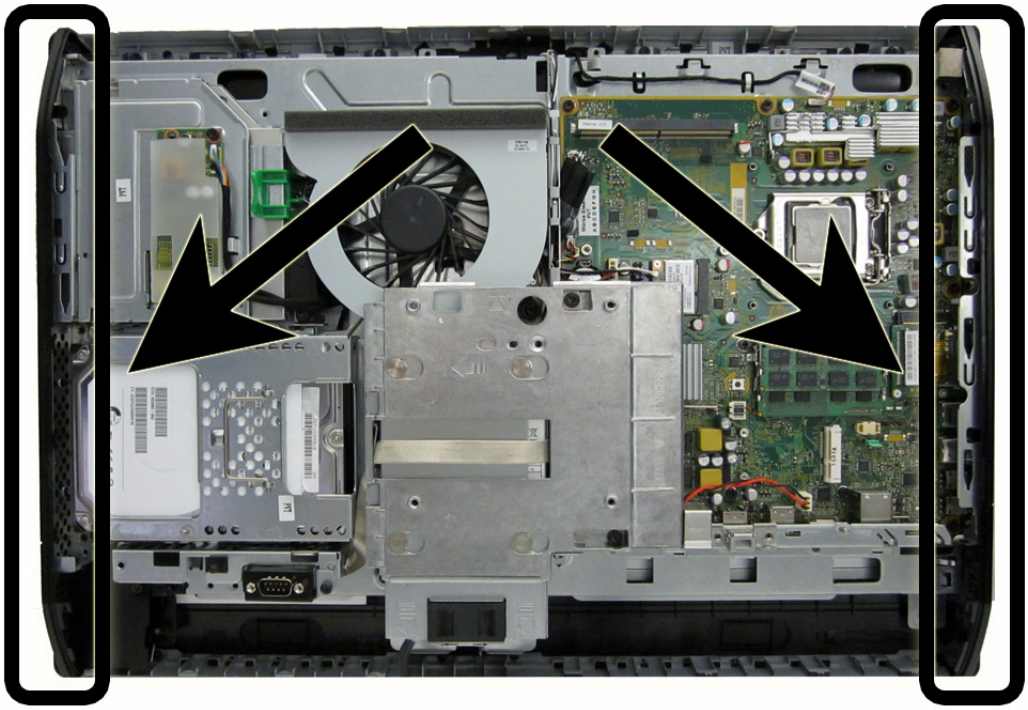
To install the fan assembly, reverse the removal procedures.

NOTE: To avoid damaging the rubber screw grommets installed around the captive screws, when installing the fan, push down on the fan assembly before you tighten the screws. Make sure the grommets are positioned correctly before tightening the screws.

Side panels

The side panels are located one each side of the computer. They are secured with tabs, and the removal procedures are similar for both panels.

Figure 7-59 Side panel locations



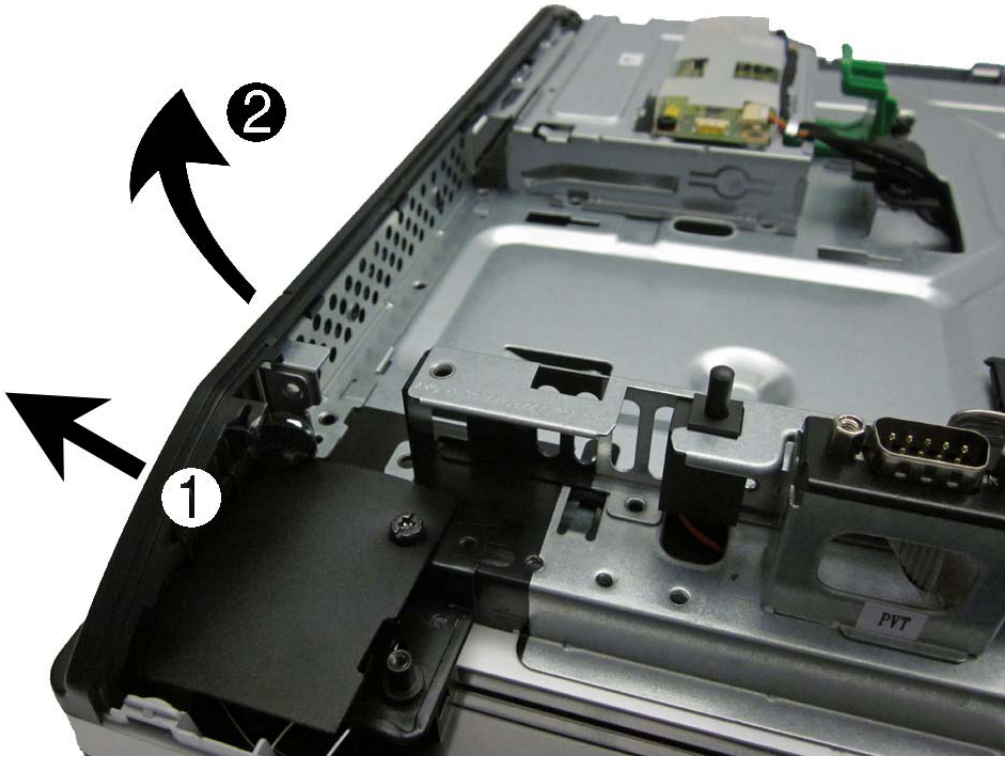
To remove the side panels:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the stand (see Stand on page 44).
4. Remove the lower panel (see Lower panel on page 46).
5. Remove the optical drive (see Replacing the optical disc drive on page 53).
6. Push the side panel out from the bottom **(1)**.

7. Rotate the panel out and off of the computer **(2)**.

NOTE: The removal and replacement procedures are similar for both panels.

Figure 7-60 Removing the side panels (left side shown)

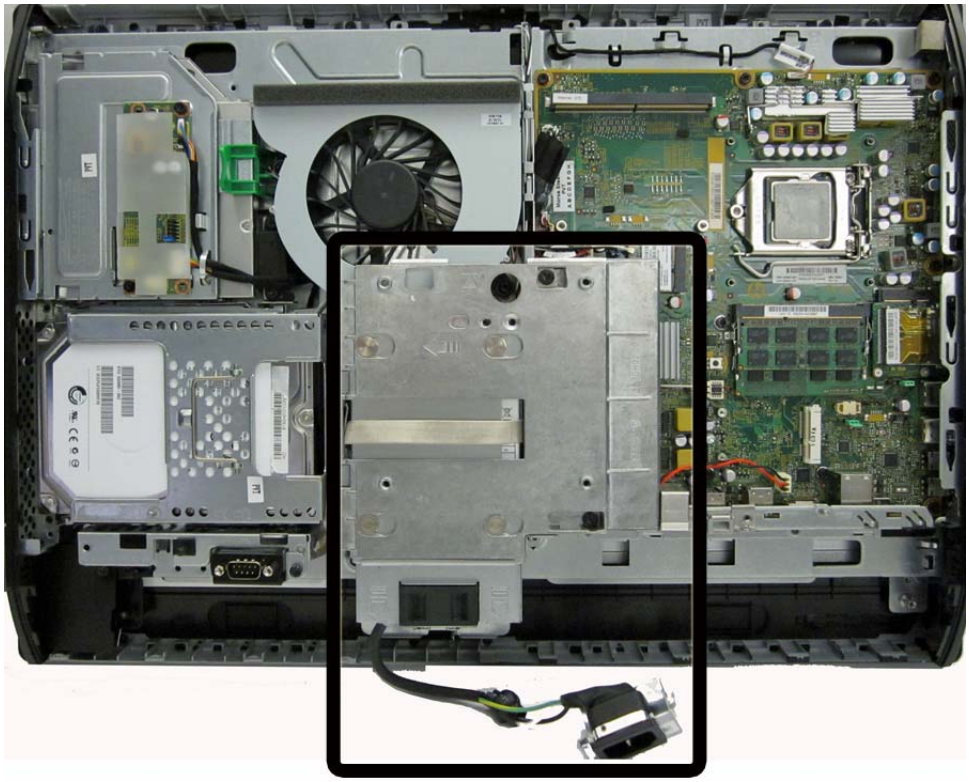


To install the side panels, reverse the removal procedures.

Power supply

The power supply is located at the middle, bottom of the computer. It is secured with two Torx screws. The power connector mounts separately with one Torx screw. The power supply slides out of the bottom of the bracket that secures it.

Figure 7-61 Power supply location

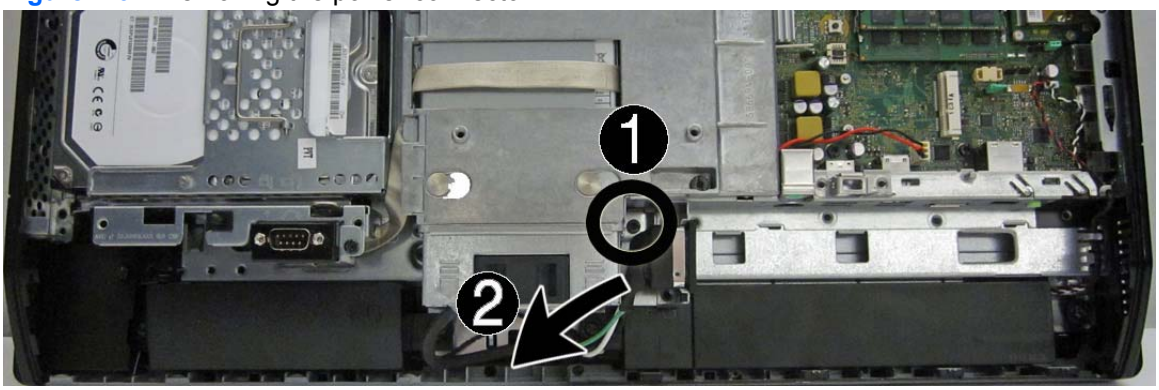


To remove the power supply:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the stand (see Stand on page 44).
4. Remove the lower panel (see Lower panel on page 46).

5. Remove the Torx screw **(1)** that secures the power connector to the computer, and then lift the connector from atop the speaker **(2)**.

Figure 7-62 Removing the power connector

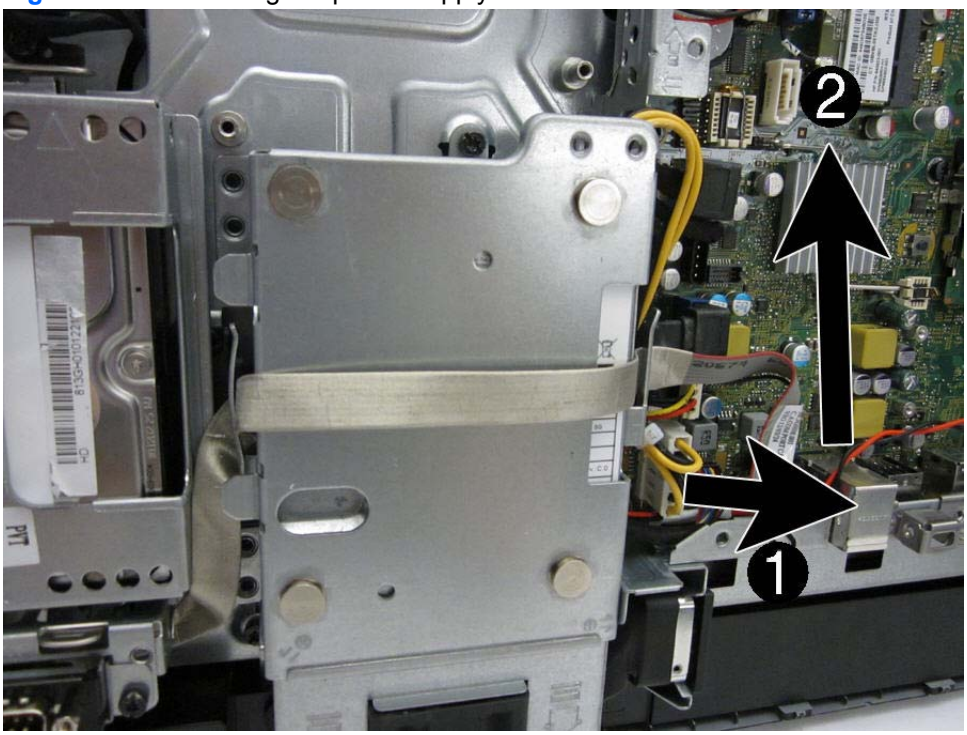


6. Disconnect the cable from the system board connector **(1)**.

7. Position the cable above the power supply **(2)**.

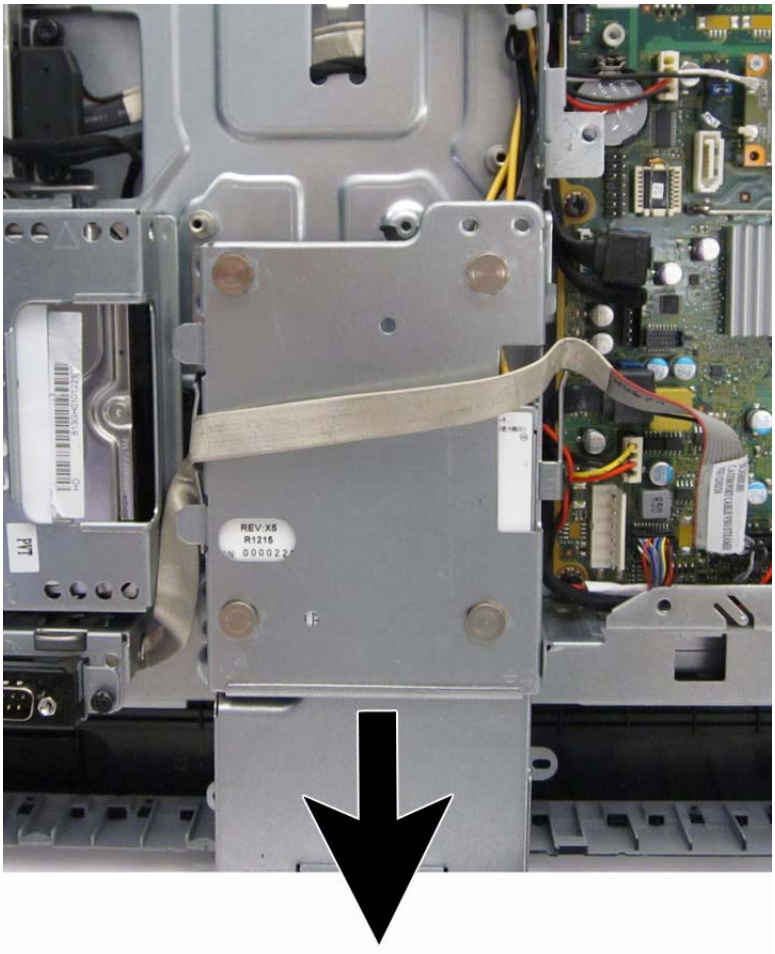
   Positioning the cable above the power supply makes it easier to slide the power supply downward and out of the bracket that secures it.

Figure 7-63 Removing the power supply



8. Slide the power supply downward and out of the bracket that houses it.

Figure 7-64 Sliding the power supply out of the housing



To install the power supply, reverse the removal procedures.

System board

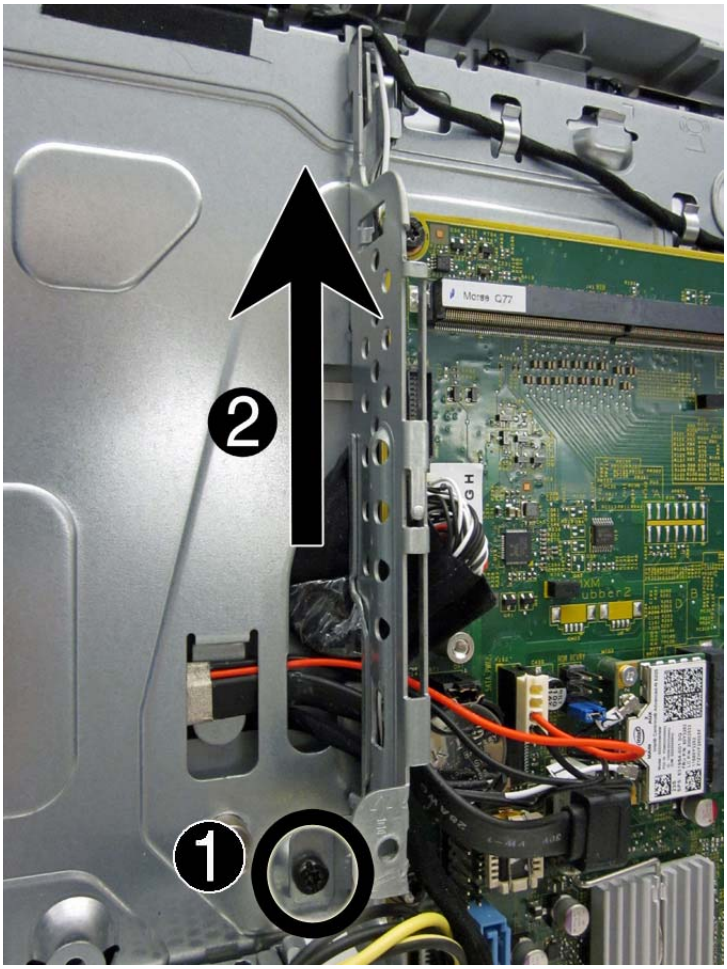
The system board is located on the right side of the computer (viewed from the rear). It is secured with eight Torx screws.

To remove the system board:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the stand (see Stand on page 44).
4. Remove the lower panel (see Lower panel on page 46).
5. Remove the memory modules (see Memory on page 56).
6. Remove the graphics heat sink (see Graphics heat sink on page 71).
7. Remove the processor heat sink (see Processor heat sink – model 6300 on page 72).
8. Remove the processor (see Processor on page 75).
9. Remove the WLAN module (see mSATA Solid-State Drive on page 76).
10. Disconnect all cables from the system board, noting their location for reinstallation.

11. Remove the cable mounting bracket by removing the Torx screw **(1)**, and then sliding it up **(2)** and lifting it out of the computer.

Figure 7-65 Removing the cable mounting bracket



12. On model 6300, remove the eight Torx screws **(1)** that secure the system board to the computer.

    On model 8300, remove the ten Torx screws that secure the system board to the computer.

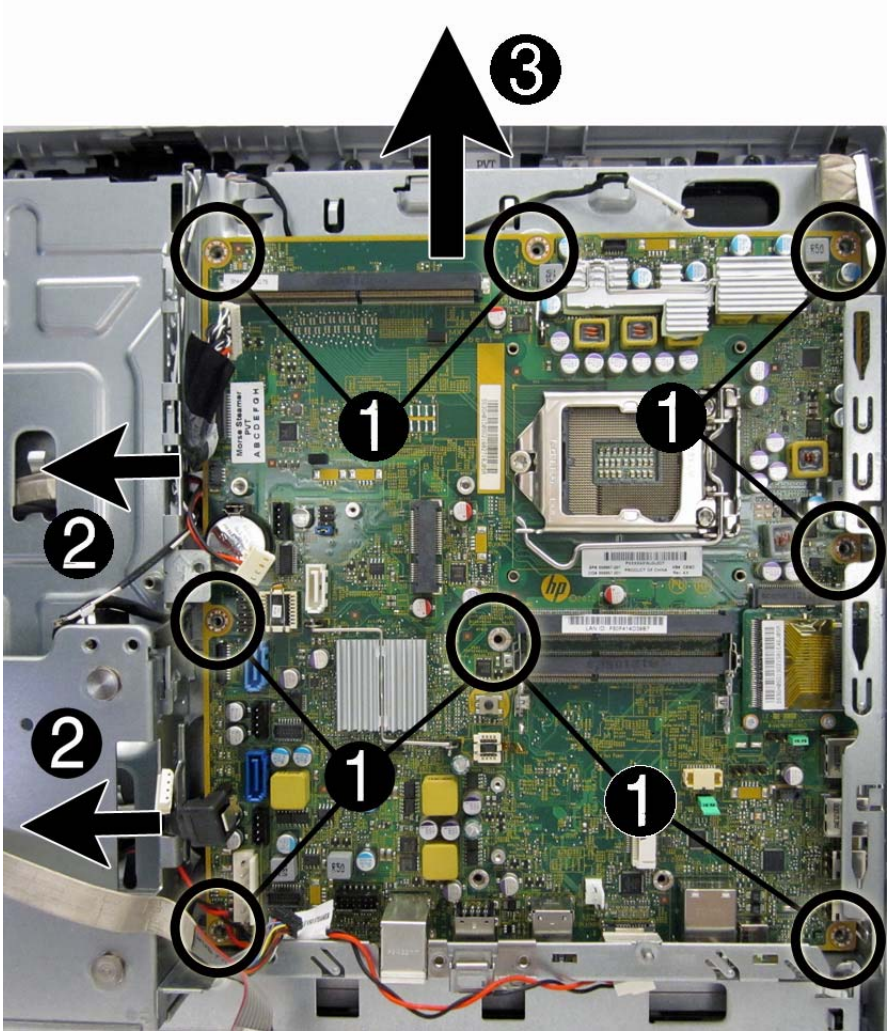
NOTE: Model 6300 shown in the following image.

13. Position the cables on the left side of the board out of the way **(2)** so you can freely slide the board out of the computer.

NOTE: To allow the system board to slide up so you can remove it, you must place the cables in the cable retention areas built into the chassis to the left of the system board. Failure to move the cables out of the way will impede system board removal.

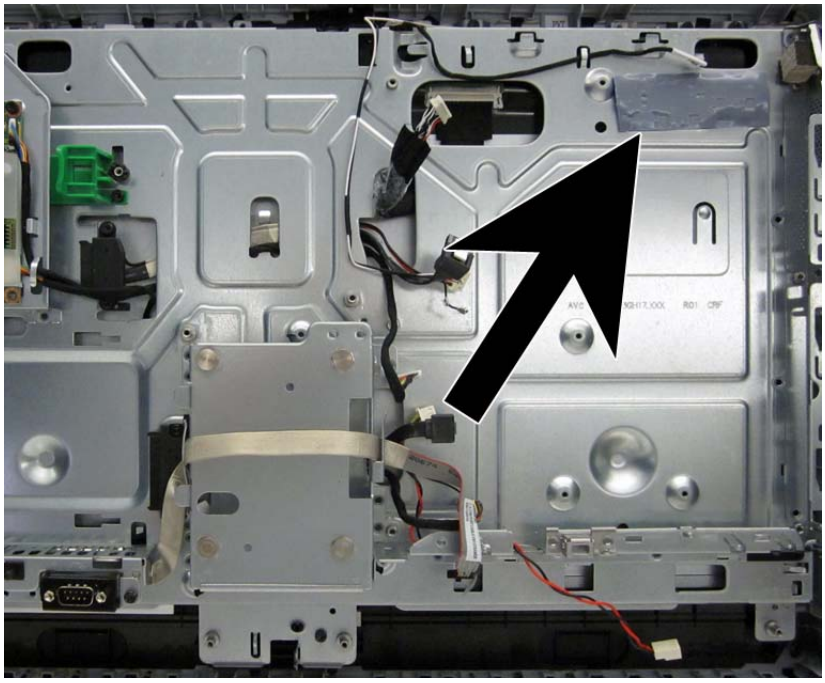
14. Slide the system board toward the top of the computer **(3)**, and then lift up the board from left side to prevent interference between the side I/O bracket with the I/O ports on board.

Figure 7-66 Removing the system board (model 6300 shown)



To install the system board, reverse the removal procedures.

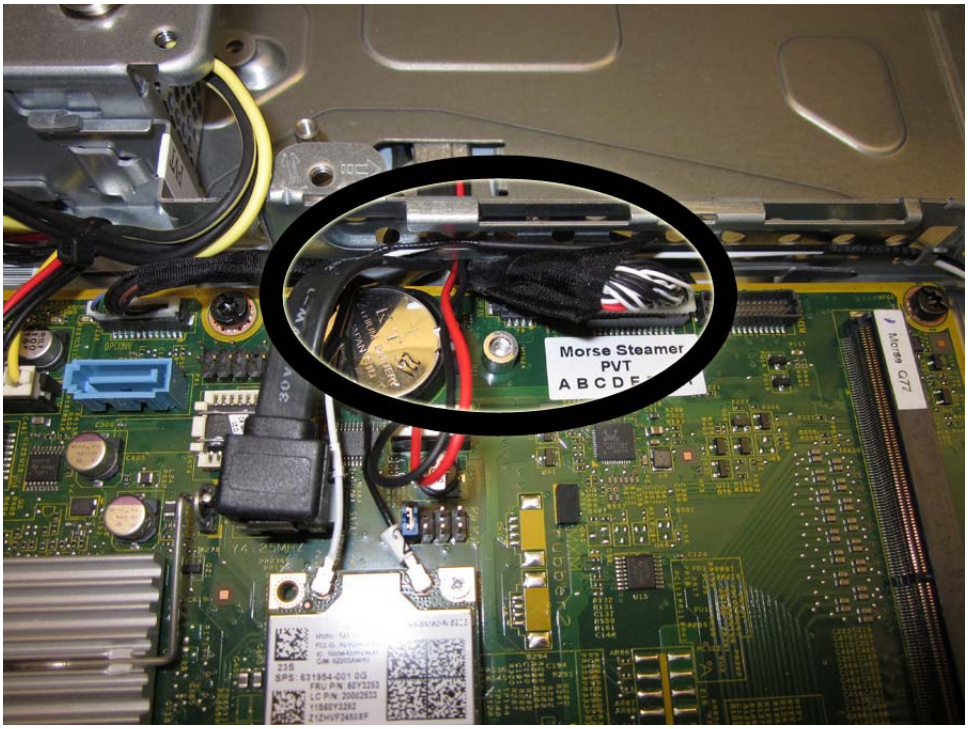
Replace the thermal pad below the system board.



When replacing the system board, be sure to route the cables correctly. See the following images for cable routing.

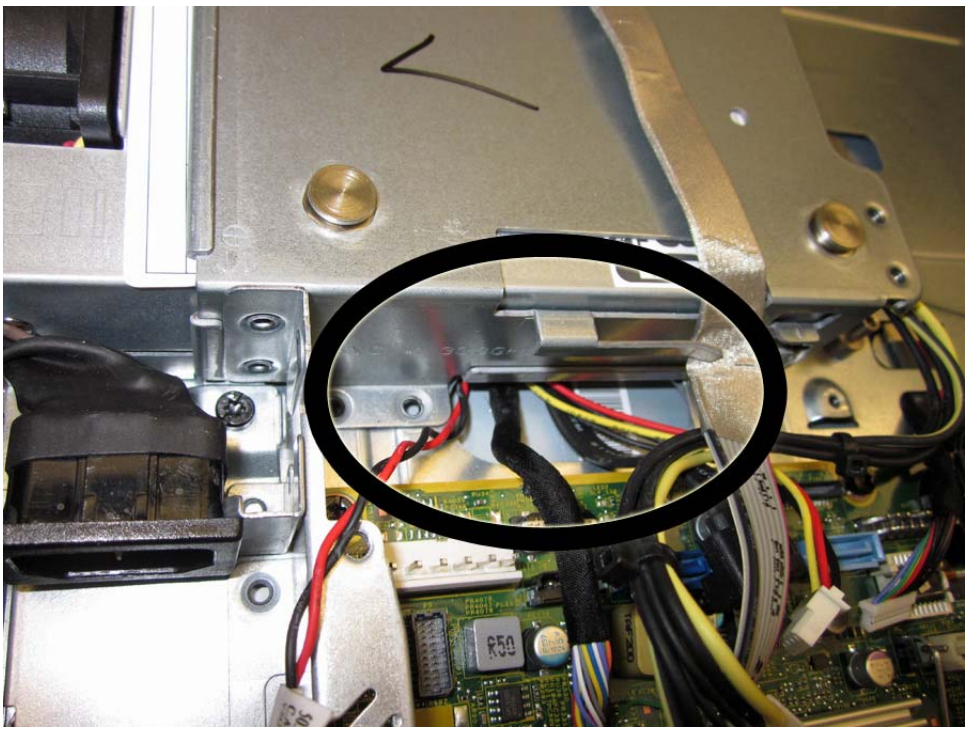
Route the following cables from under the system board cable mounting bracket:

- Display (LVDS)
- Optical drive data (SATA)
- Optical drive power
- Converter board



Route the following cables from under the power supply:

- Power button board
- Hard drive data (SATA)
- Hard drive power
- Hood sensor



Updating SMBIOS Information

When replacing the system board, you must reprogram the SMBIOS information on the affected computer. Failure to reprogram the board will result in eventual failure, such as an activation failure (need to reactivate the system) or a system recovery failure.

To update SMBIOS information in Computer Setup:

1. Turn on or restart the computer.
2. Press Esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

NOTE: If you do not press Esc at the appropriate time, you must restart the computer and again press Esc when the monitor light turns green to access the utility.

3. Press F10 to enter Computer Setup.
4. Go to **Security** > **System ID’s**.
5. If necessary, press Ctrl+A to initiate edit mode.
6. Edit the fields listed. If the feature byte has data or is not editable, then it was not cleared and cannot be edited.

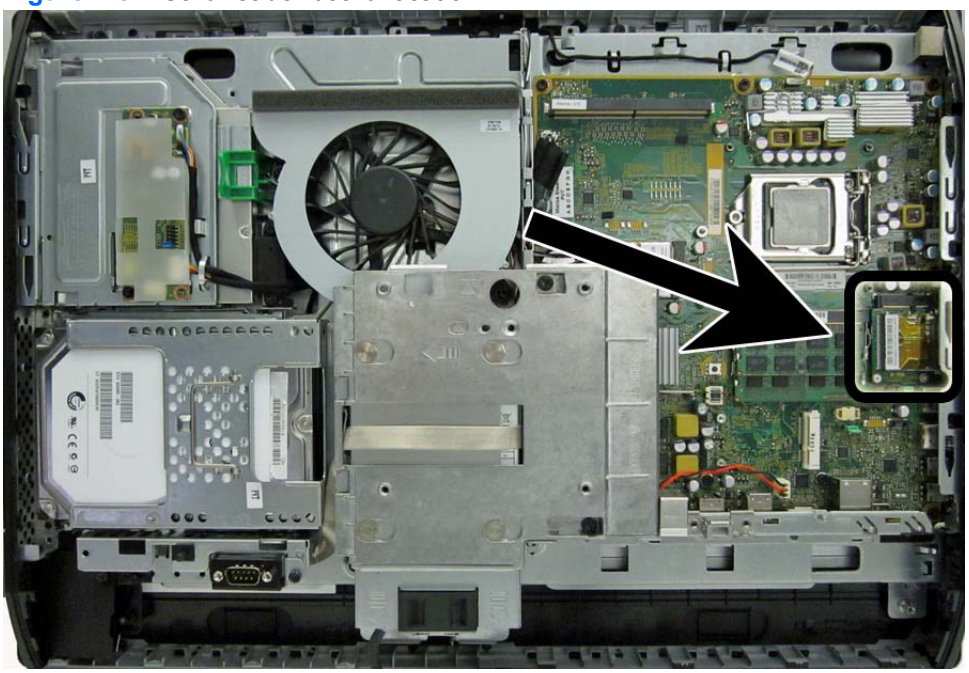
System ID Setup Page

Setup Field Name	Comment	Label
Product Name	Enter the Model name/number or marketing name.	Flexbuild
Serial Number	Enter the Serial Number of Unit.	Support
SKU Number	Enter the SKU or Product Number including Localization Code.	Support
Asset Tag	Enter the 18-byte identifier assigned to the computer.	Support
Feature Byte	Enter the Feature Byte string. The feature byte string is case sensitive. The label includes spaces after every four characters. You can enter or ignore these spaces – their only purpose is to help with data entry. There is a character limitation of 40 bytes per line. When you reach this limit, go to the next line to continue data entry. BIOS ignores the spaces and lines. If you make an error during data entry, the data will not validate, and the computer asks you to correct your data input.	Flexbuild
Build ID	The Build ID of the unit.	Flexbuild

Card reader board

The card reader board is located on the right side of the system board. It is secured with two screws.

Figure 7-67 Card reader board location

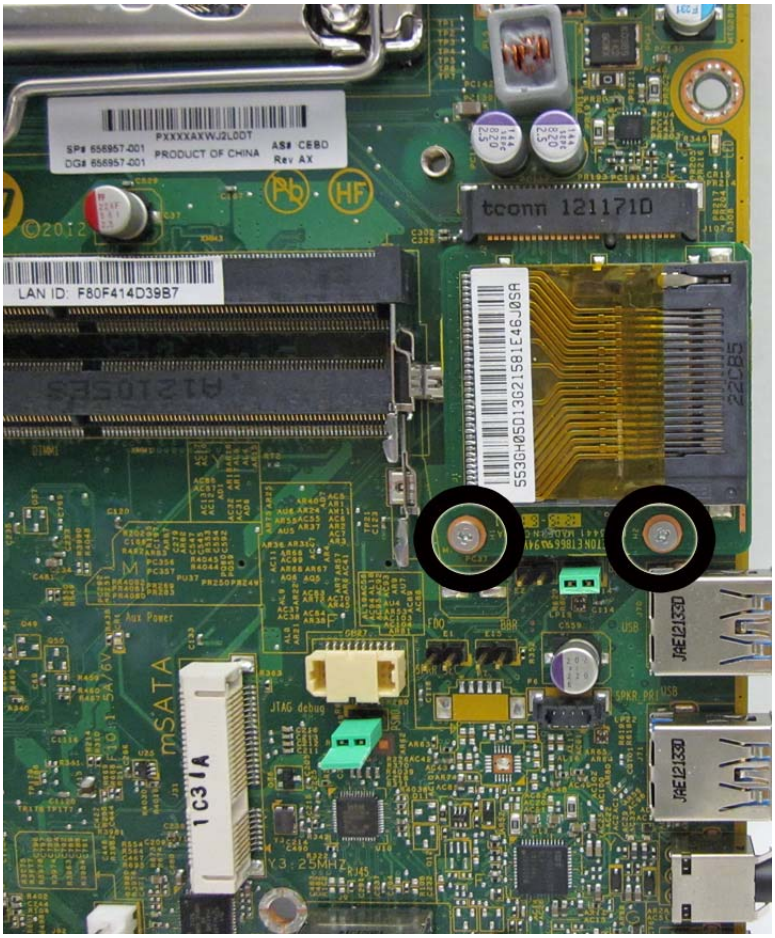


To remove the card reader board:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).

3. Remove the two Phillips screws **(1)** that secure the board to the system board.

Figure 7-68 Removing the card reader board screws



4. Lift the board to a 45-degree angle **(1)**, and then pull it away to remove it from the socket **(2)**.

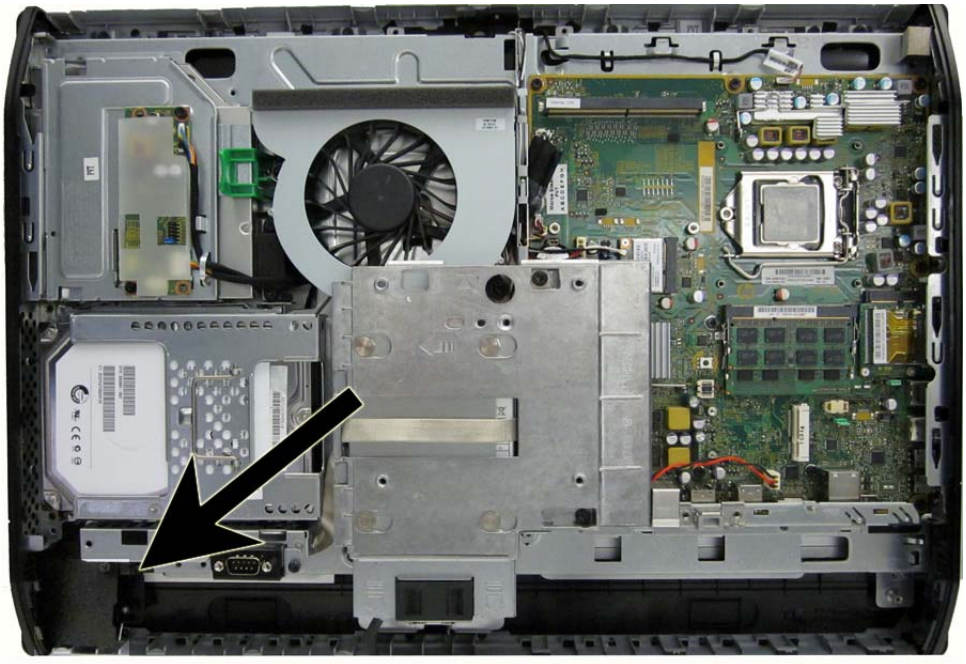
Figure 7-69 Removing the card reader board

To install the card reader board, reverse the removal procedures.

Power button board

The power button board is located on the bottom left corner of the computer. It is covered by a Mylar shield and has two connectors and one screw.

Figure 7-70 Power button board location



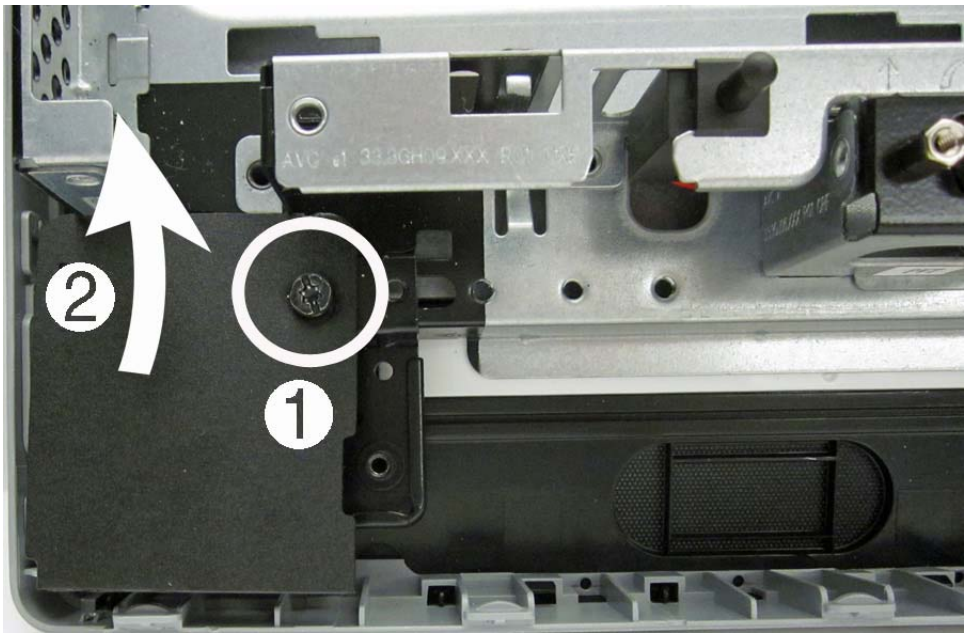
To remove the power button board:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the stand (see Stand on page 44).
4. Remove the lower panel (see Lower panel on page 46).
5. Remove the optical drive (see Replacing the optical disc drive on page 53).
6. Remove the left side panel (see Side panels on page 84).

7. Remove the Torx screw **(1)** that secures the Mylar that covers the power button board, and then lift the Mylar from the computer **(2)**.

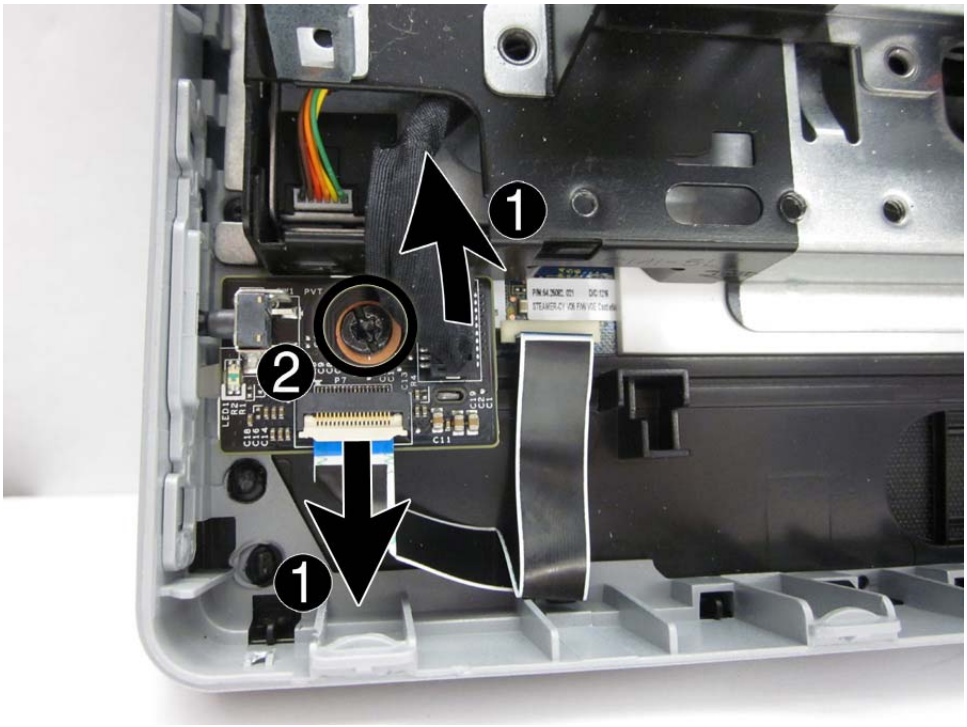
NOTE: On some models, the left screw that secures the left speaker (when viewed from the rear) may also secure the Mylar.

Figure 7-71 Removing the Mylar shield



8. Disconnect the two cables **(1)** from the board, and then remove the Torx screw that secures the board to the computer **(2)**.

Figure 7-72 Removing the power button board



9. Remove the power button board from the computer.

To install the power button board, reverse the removal procedures.

Front bezel

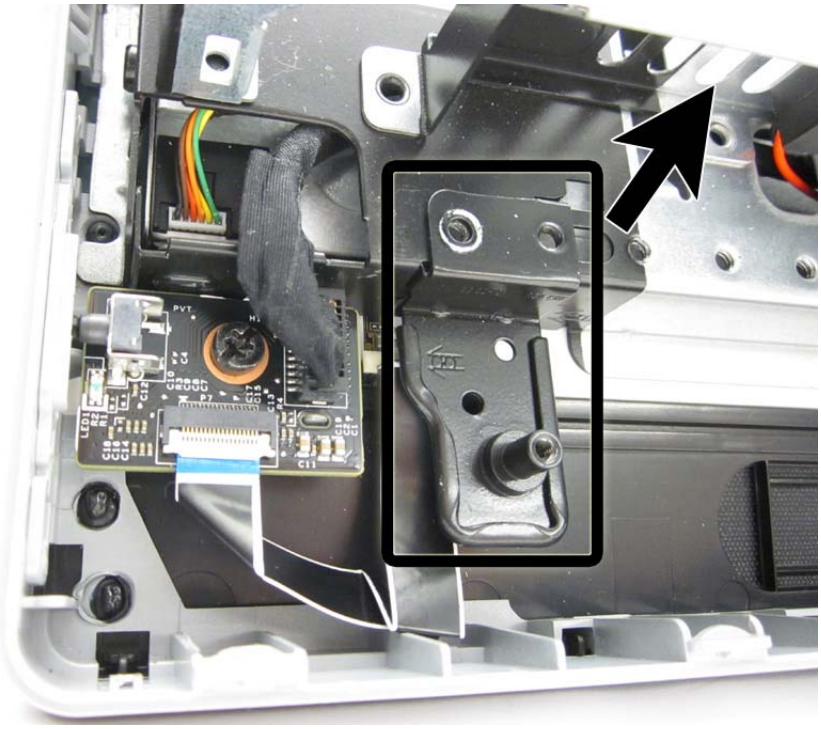
The front bezel is located on the front of the computer and is secured to the main system bracket with eight Torx screws.

Replacement bezels include the webcam shutter and capacitive sensor board. On models that do not include a webcam, you must remove the shutter and install the webcam insert (Webcam assembly kit) into the slot in which the webcam would otherwise be installed.

To remove the front bezel:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the stand (see Stand on page 44).
4. Remove the lower panel (see Lower panel on page 46).
5. Remove the optical drive (see Replacing the optical disc drive on page 53).
6. Remove the metal plate (see Metal plate on page 47).
7. Remove the power supply (see Power supply on page 86).
8. Remove the side panels (see Side panels on page 84).
9. Remove the speakers (see Speakers on page 82).
10. Remove the power button board (see Power button board on page 97).
11. Lift the bracket from the bottom-left side of the computer.

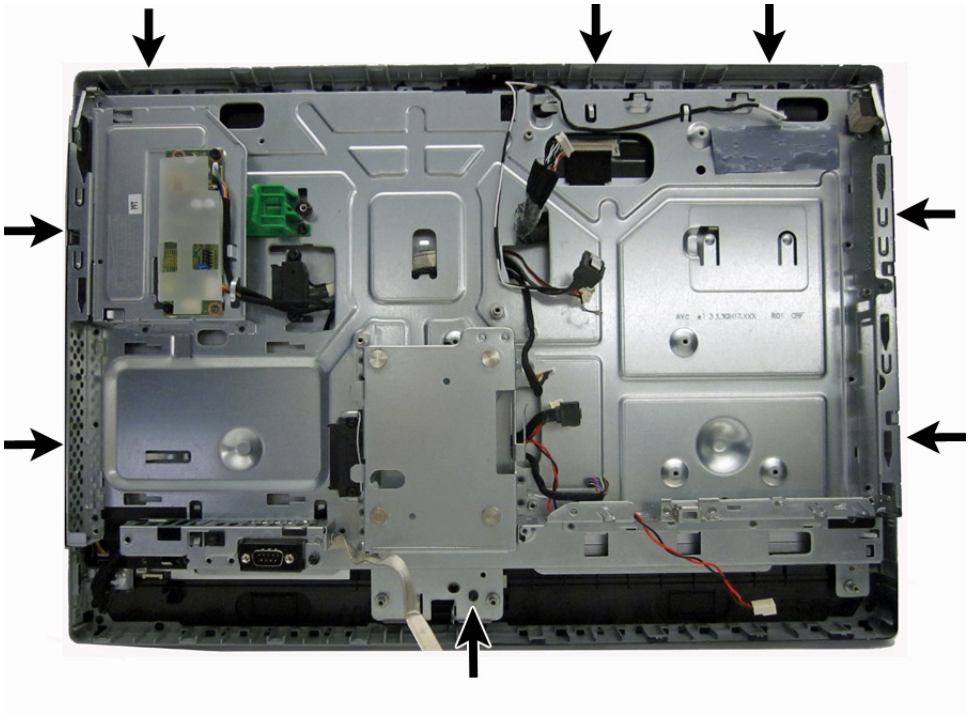
Figure 7-73 Removing the bracket



12. Remove the Torx screws that secure the bezel to the main system bracket assembly, as follows:

- Model 6300: 11 total screws
  - Left: 2 screws
  - Top: 4 screws
  - Right 2 screws
  - Bottom: 2 screw

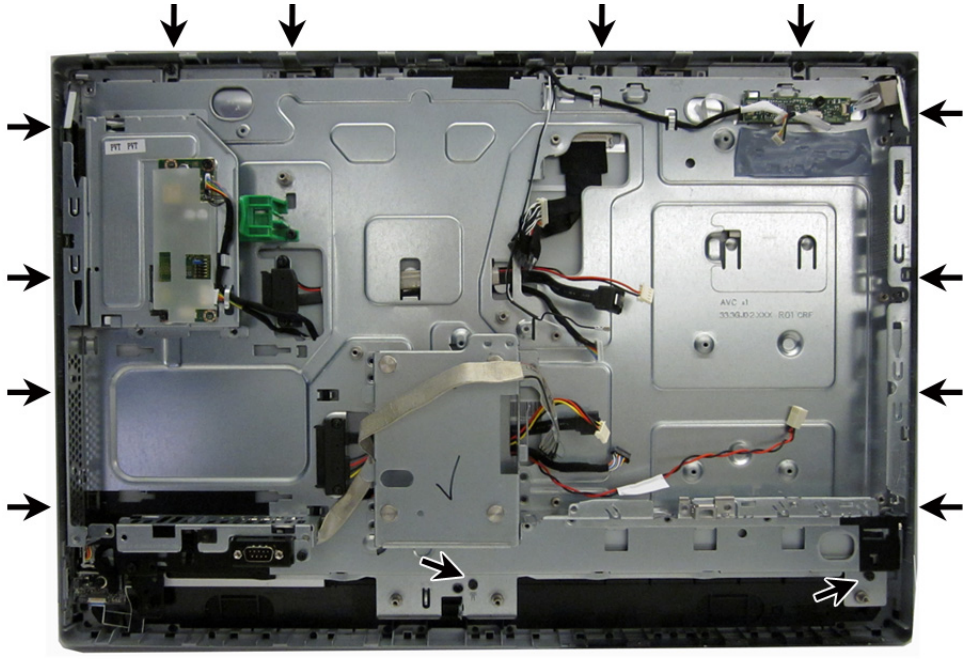
Figure 7-74 Front bezel assembly screw locations – 6300 models



- Model 8300: 14 total screws
  - Left: 4 screws
  - Top: 4 screws

- Right 4 screws
- Bottom: 2 screw

Figure 7-75 Front bezel assembly screw locations – 8300 models



13. Lift the bracket from the bezel.

To install the front bezel, reverse the removal procedures.

Antenna

The antenna route from the WLAN card to the top of the computer.

To remove the antenna:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the optical drive (see Replacing the optical disc drive on page 53).
4. Remove the stand (see Stand on page 44).
5. Remove the lower panel (see Lower panel on page 46).
6. Remove the metal plate (see Metal plate on page 47).
7. Remove the power supply (see Power supply on page 86).
8. Remove the side panels (see Side panels on page 84).
9. Remove the speakers (see Speakers on page 82).
10. Remove the system board (see System board on page 89).
11. Remove the front bezel (see Front bezel on page 100).

12. Remove the two Torx screws that secure each antenna to the frame.

Figure 7-76 Removing the antenna

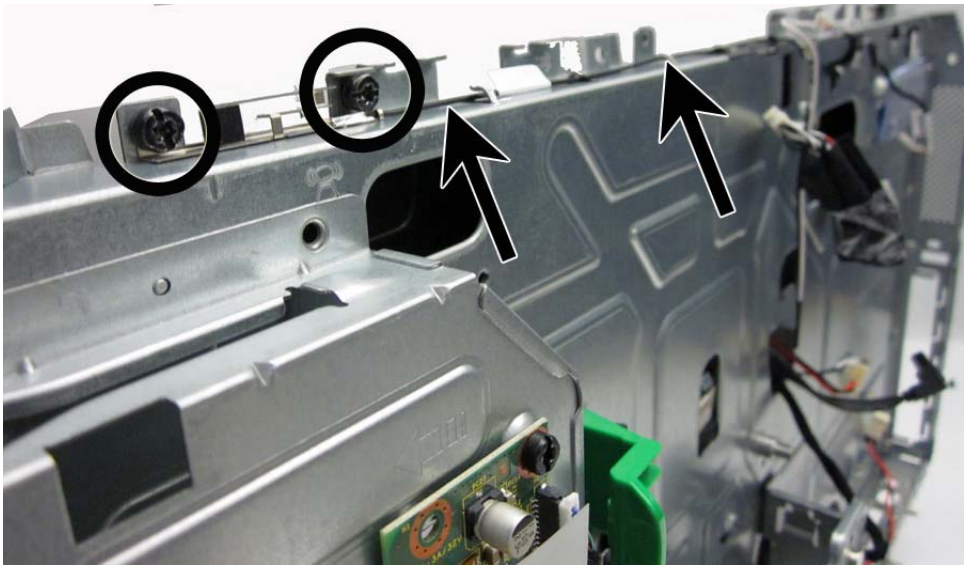
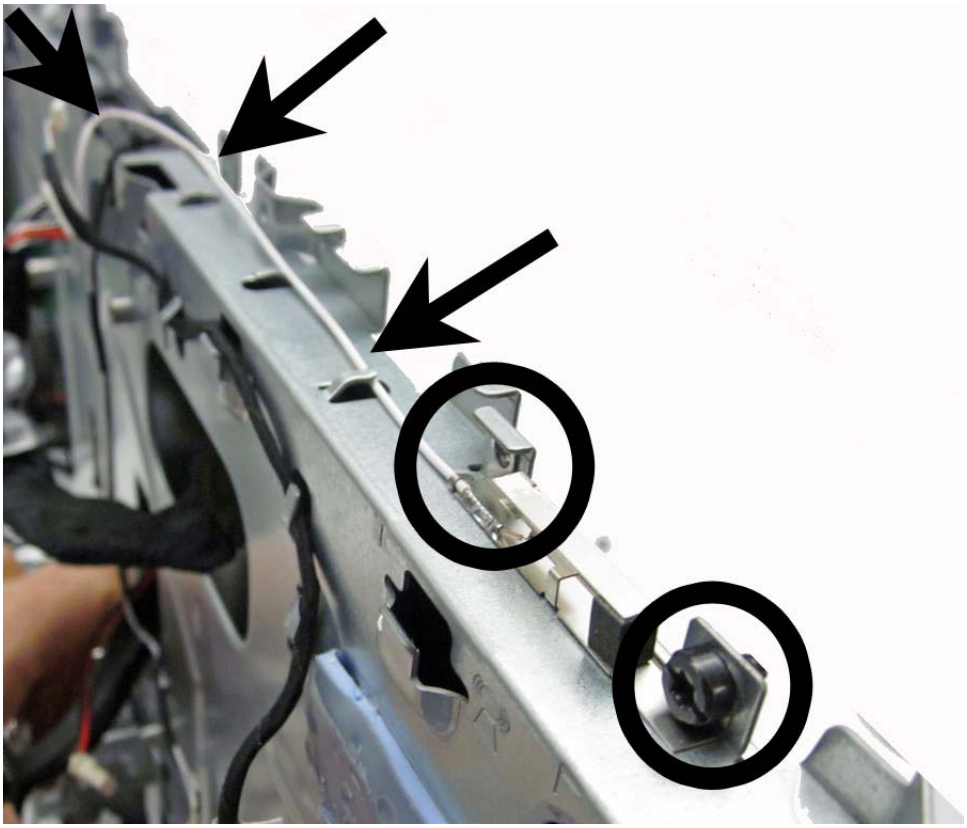
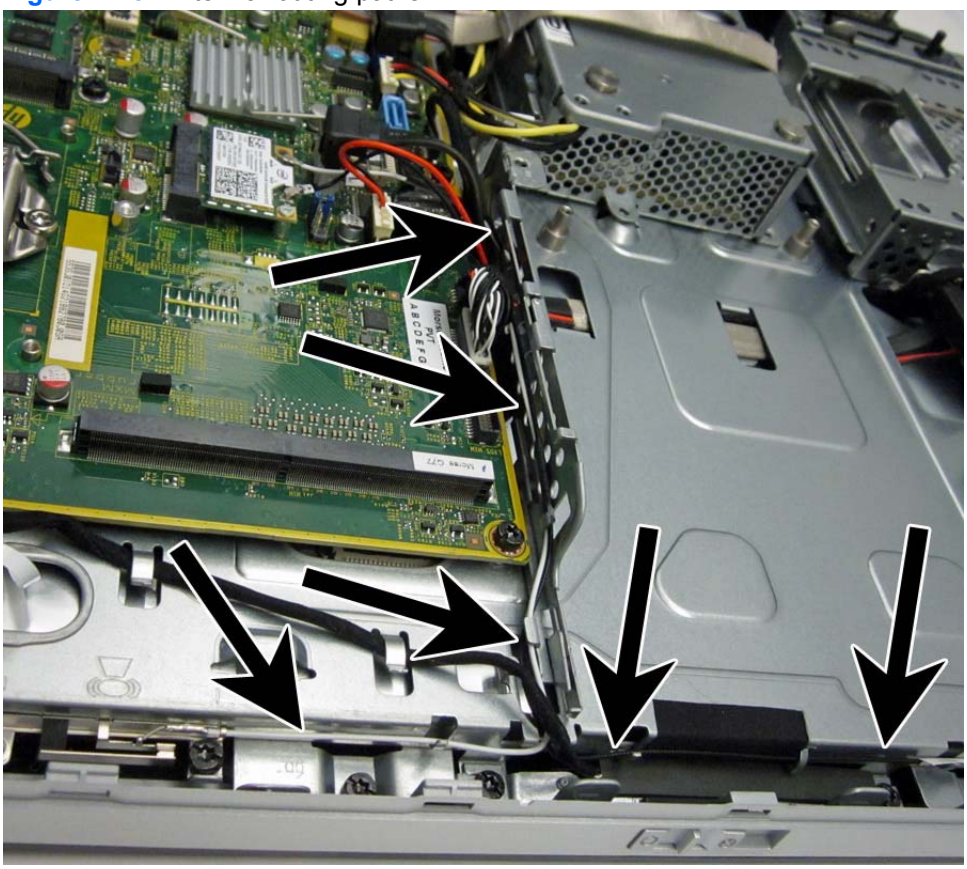


Figure 7-77 Removing the antenna



13. Note the routing path for each antenna for replacement.

Figure 7-78 Antenna routing paths



To install the antenna, reverse the removal procedures.

Display panel

Model 6300 offers three different display panels – LG, AUO, and CMI.

Model 8300 offers three different display panels – LG, Samsung, and CMI.

Display panels require a backlight cable specific to the manufacturer. Make sure you use the backlight cable packaged with the display panel.

The display panel is secured to the base pan with four Torx screws.

To remove the display panel:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the optical drive (see Replacing the optical disc drive on page 53).
4. Remove the stand (see Stand on page 44).
5. Remove the lower panel (see Lower panel on page 46).
6. Remove the metal plate (see Metal plate on page 47).

7. Remove the power supply (see Power supply on page 86).
8. Remove the speakers (see Speakers on page 82).
9. Remove the side panels (see Side panels on page 84).
10. Remove the front bezel (see Front bezel on page 100).
11. Disconnect the backlight cable from the display panel.

NOTE: Replace the backlight cable with the new backlight cable that comes with the new display panel kit.

Remove the backlight cable from the defective panel before sending the panel back to the supplier.

Figure 7-79 Disconnecting the backlight cable from the display panel

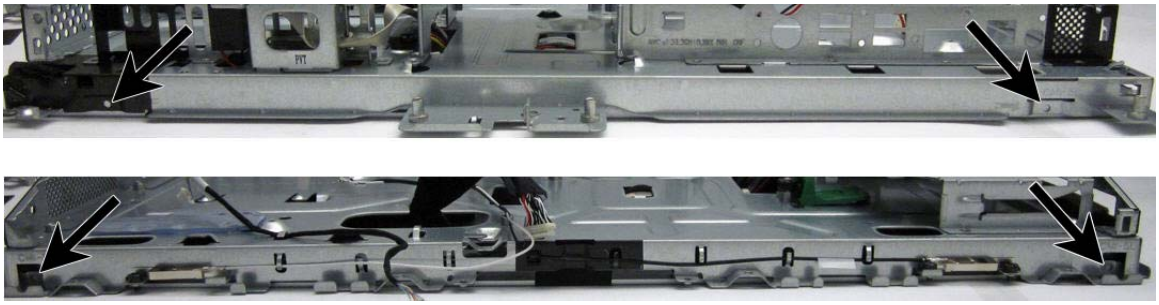
12. Model 6300: Remove the four Torx screws that secure the display panel to the frame. The screw locations for each manufacturer are stamped into the metal.

The LG **(1)** and AUO **(2)** panels are secured with two screws on each side (left and right).

Figure 7-80 Display panel screw locations – 6300 models – LG or AUO panel

The CMI panel is secured with two screws on top, two screws on the bottom.

Figure 7-81 Display panel screw locations – 6300 models – CMI panel

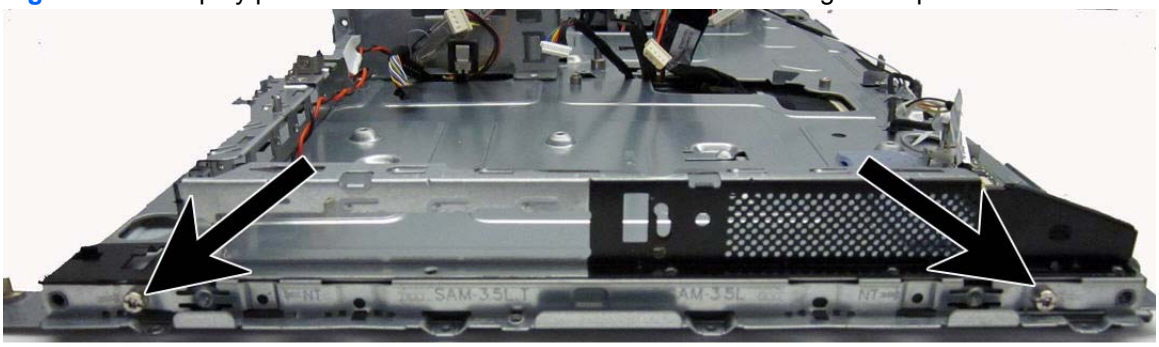


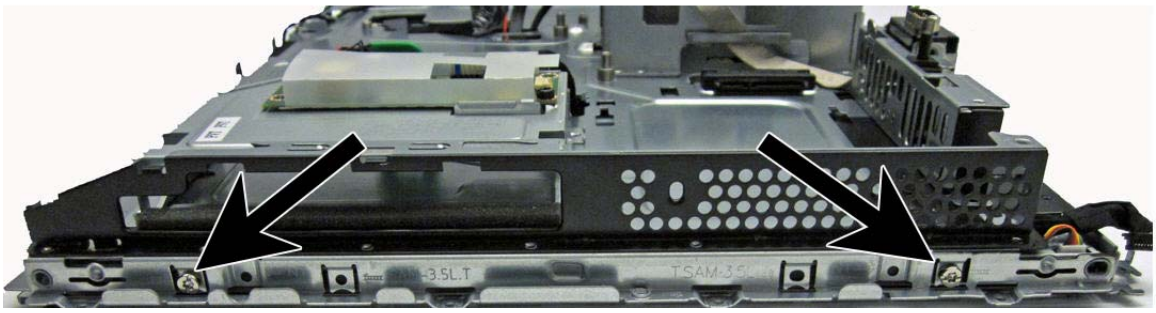
- or-

13. Model 8300: Remove the four Torx screws that secure the display panel to the frame. The screw locations for each manufacturer are stamped into the metal.

    The LG **(1)** and AUO **(2)** panels are secured with two screws on each side (left and right).

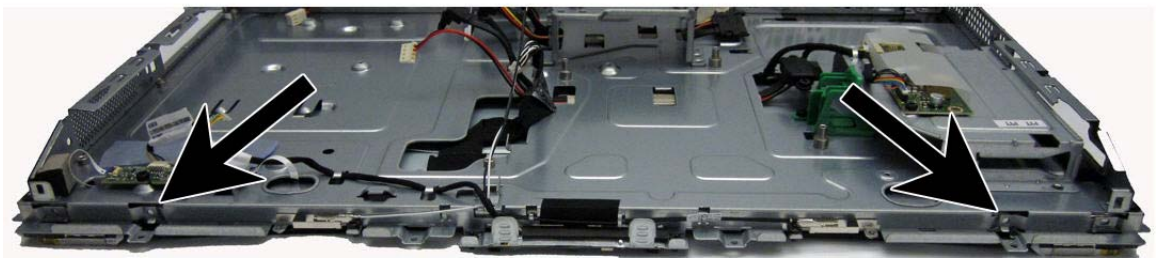
    Figure 7-82 Display panel screw locations – 8300 models – Samsung or LG panel





    The CMI panel is secured with two screws on top, two screws on the bottom.

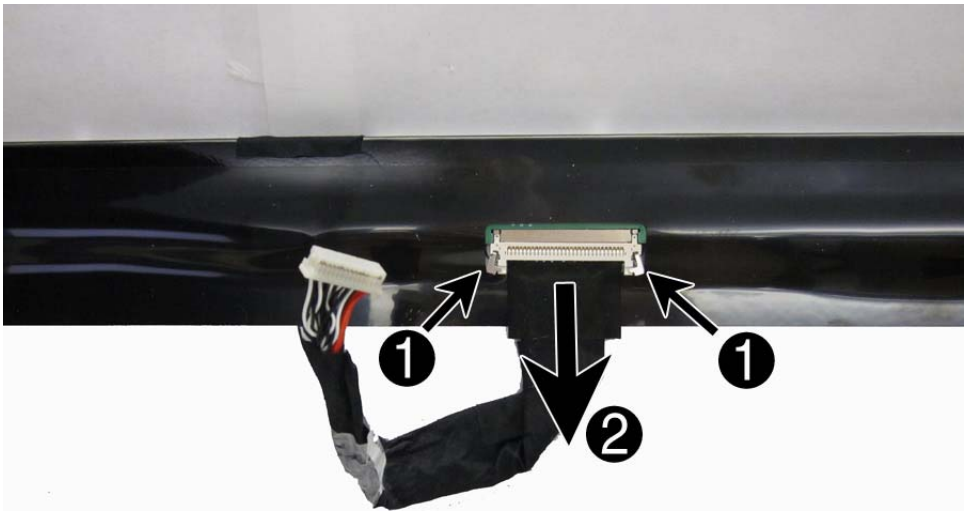
    Figure 7-83 Display panel screw locations – 8300 models – CMI panel



14. Lift the display panel from the frame.

15. Disconnect the display cable from the display panel by pressing in on the tabs **(1)** on the side of the connector, and pulling the cable from the connector **(2)**.

Figure 7-84 Disconnecting the display cable from the display panel

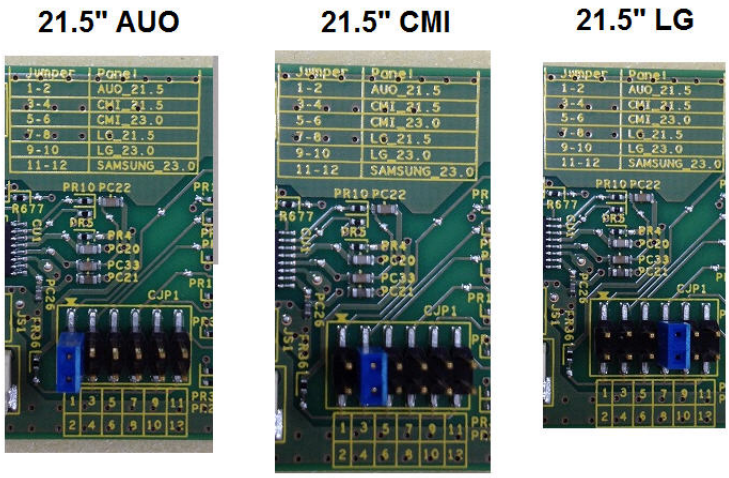


Be sure to correctly position the jumpers on the converter board for the installed display panel, as follows:

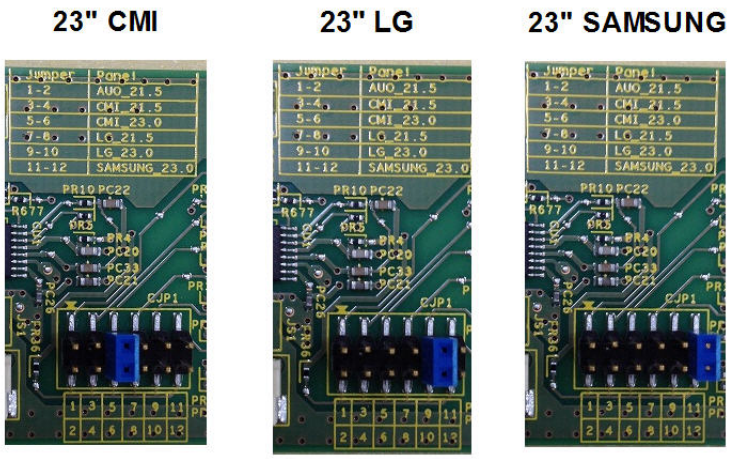
CAUTION: Incorrect jumper placement can result in damage to the converter board and display panel.

- 21.5-inch panel
  - AUO panel: pins (1)(2)
  - CMI panel: pins (3)(4)
  - LG panel: pins (7)(8)
- 23.0-inch panel
  - CMI panel: pins (5)(6)
  - LG panel: pins (9)(10)
  - Samsung panel: pins (11)(12)

21.5-inch

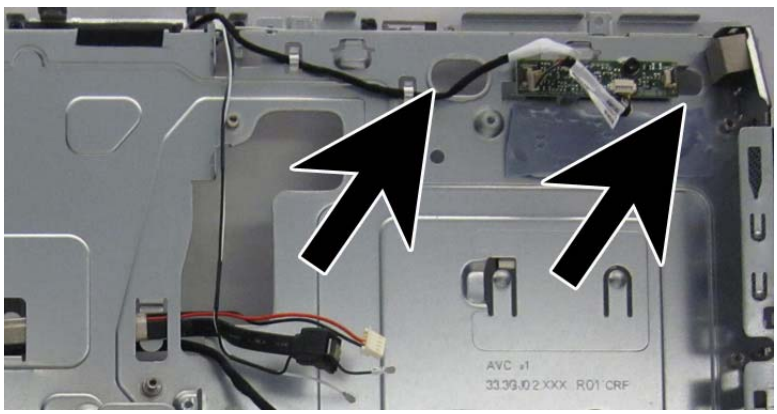


23.0-inch



To install a display panel, reverse the removal procedures.

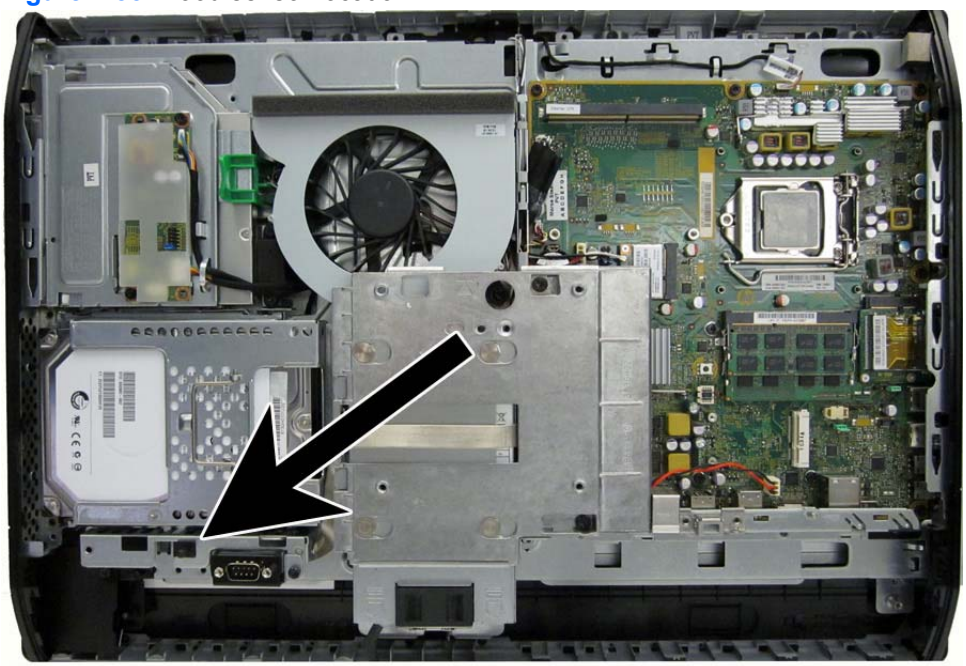
When replacing a touch display panel, be sure to route the ZIF cables through separate holes in the frame so they correctly connect to the touch sensor board.



Hood sensor

The hood sensor is located on the bottom left of the computer (when viewed from behind).

Figure 7-85 Hood sensor location

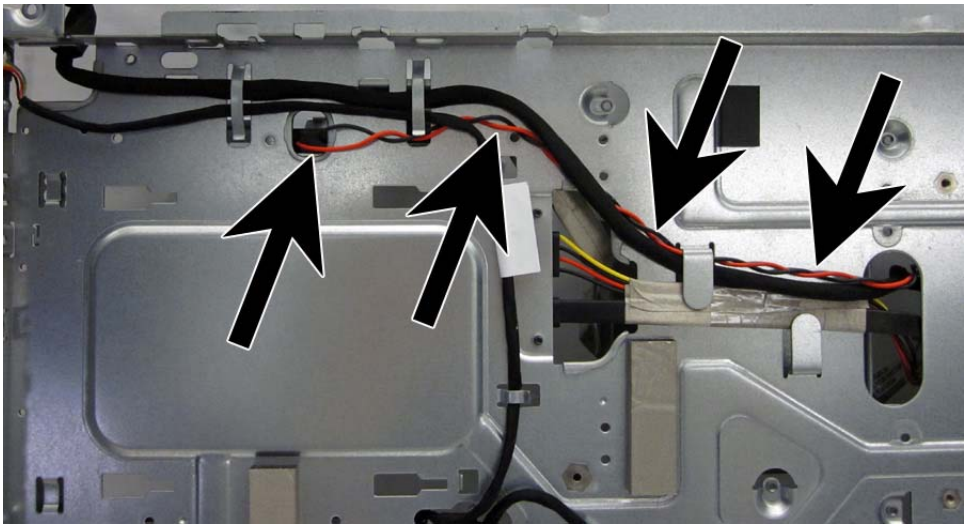


To remove the hood sensor:

1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
3. Remove the access panel (see Access panel on page 42).
4. Remove the stand (see Stand on page 44).
5. Remove the lower panel (see Lower panel on page 46).
6. Remove the side panels (see Side panels on page 84).
7. Remove the metal plate (see Metal plate on page 47).
8. Remove the power supply (see Power supply on page 86).
9. Remove the system board (see System board on page 89).
10. Remove the front bezel (see Front bezel on page 100).
11. Remove the display panel (see Display panel on page 105).
12. Disconnect the hood sensor cable from the system board connector labeled HSENSE.

13. Remove the cable from its routing path.

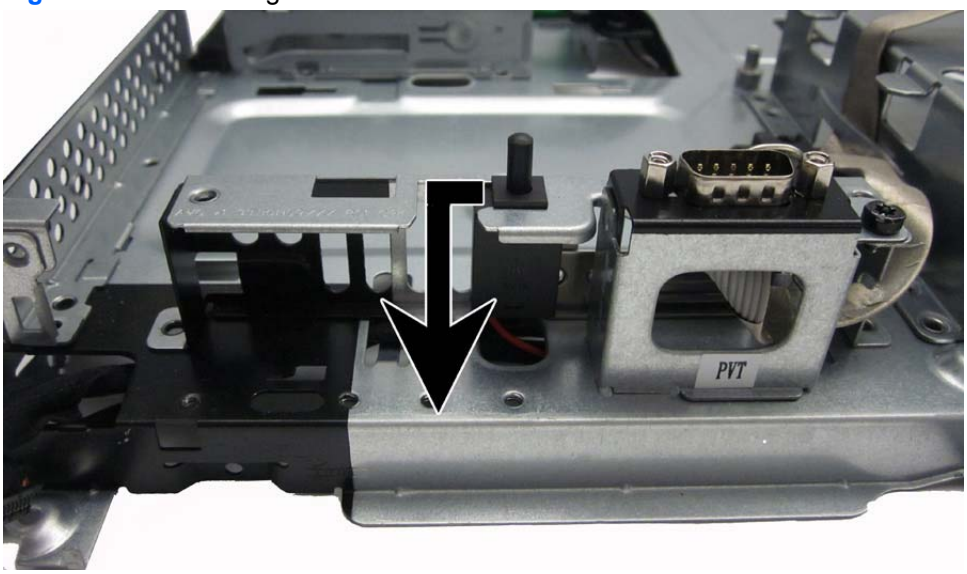
Figure 7-86 Hood sensor cable routing path



14. Slide the hood sensor out of its slot built into the chassis.

NOTE: the hood sensor fits tightly into the slot. Removal may require a flat-blade screwdriver to help disengage it.

Figure 7-87 Removing the hood sensor



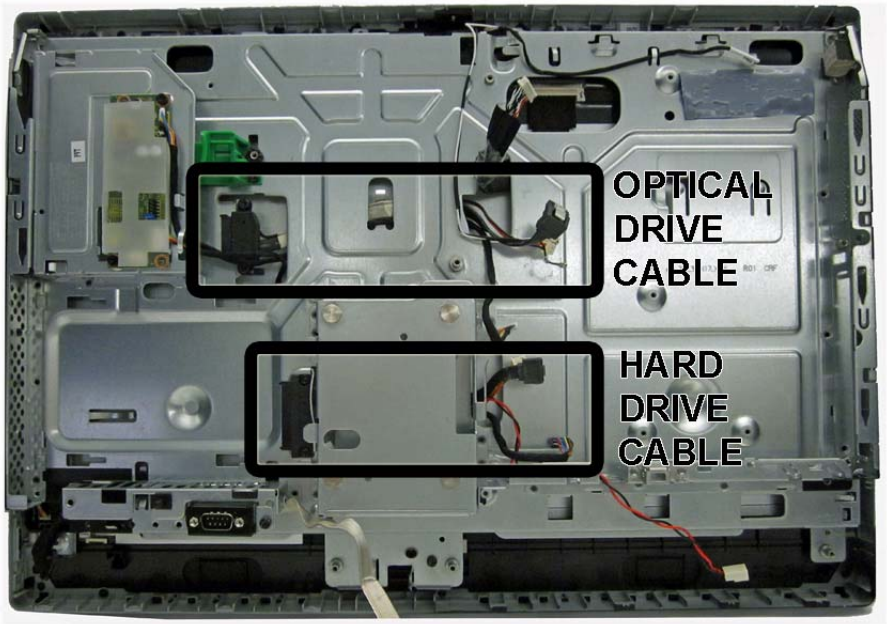
To install the hood sensor, reverse the removal procedures.

Hard drive and optical drive cables and connectors

The hard drive and optical drive connectors are located near the middle of the computer, partially under the main display bracket. Each connector is secured with two Torx screws and has two cables that connect to the system board.

The optical drive connector cables are longer than the hard drive connector cables.

Figure 7-88 Hard drive cable and optical drive cable location



To remove the hard drive or optical drive connector:

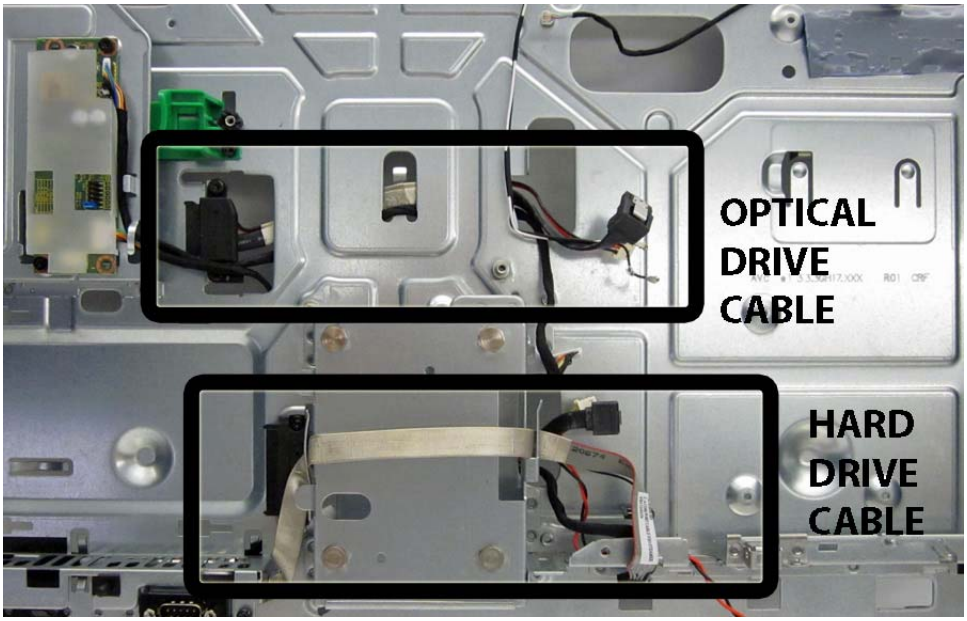
1. Prepare the computer for disassembly (see Preparing to disassemble the computer on page 38).
2. Remove the access panel (see Access panel on page 42).
3. Remove the stand (see Stand on page 44).
4. Remove the lower panel (see Lower panel on page 46).
5. Remove the side panels (see Side panels on page 84).
6. Remove the metal plate (see Metal plate on page 47).
7. Remove the power supply (see Power supply on page 86).
8. Remove the system board (see System board on page 89).
9. Remove the front bezel (see Front bezel on page 100).
10. Remove the display panel (see Display panel on page 105).
11. Remove two Torx screws that secure the hard drive connector or the optical drive connector to the computer.
12. Remove the cables from the metal clips built into the computer.

13. Disconnect the hard drive cables or the optical drive cables from the system board.

NOTE: Be careful not to damage the cable when disconnecting it from the board. Do not pull on the wires.

14. Remove the connector from the computer.

Figure 7-89 Removing the hard drive or optical drive connectors



To install the hard drive or optical drive connector, reverse the removal procedures.

8 Troubleshooting Without Diagnostics

This chapter provides information on how to identify and correct minor problems, such as USB devices, hard drive, optical drive, graphics, audio, memory, and software problems. If you encounter problems with the computer, refer to the tables in this chapter for probable causes and recommended solutions.

NOTE: For information on specific error messages that may appear on the screen during Power-On Self-Test (POST) at startup, refer to Appendix A, POST Error Messages on page 164.

Safety and Comfort

WARNING! Misuse of the computer or failure to establish a safe and comfortable work environment may result in discomfort or serious injury. Refer to the *Safety & Comfort Guide* at http://www.hp.com/ergo for more information on choosing a workspace and creating a safe and comfortable work environment. For more information, refer to the *Safety & Regulatory Information* guide.

Before You Call for Technical Support

If you are having problems with the computer, try the appropriate solutions below to try to isolate the exact problem before calling for technical support.

- Run the HP diagnostic tool.
- Run the hard drive self-test in Computer Setup. Refer to Computer Setup (F10) Utility on page 12 for more information.
- Check the Power LED on the front of the computer to see if it is flashing red. The flashing lights are error codes that will help you diagnose the problem. Refer to Appendix A, POST Error Messages on page 164 for more information.
- If the screen is blank, plug the monitor into a different video port on the computer if one is available. Or, replace the monitor with a monitor that you know is functioning properly.
- If you are working on a network, plug another computer with a different cable into the network connection. There may be a problem with the network plug or cable.
- If you recently added new hardware, remove the hardware and see if the computer functions properly.
- If you recently installed new software, uninstall the software and see if the computer functions properly.
- Boot the computer to the Safe Mode to see if it will boot without all of the drivers loaded. When booting the operating system, use “Last Known Configuration.”

- Refer to the comprehensive online technical support at http://www.hp.com/support.
- Refer to Helpful Hints on page 116 in this guide.

To assist you in resolving problems online, HP Instant Support Professional Edition provides you with self-solve diagnostics. If you need to contact HP support, use HP Instant Support Professional Edition's online chat feature. Access HP Instant Support Professional Edition at: http://www.hp.com/go/ispe.

Access the Business Support Center (BSC) at http://www.hp.com/go/bizsupport for the latest online support information, software and drivers, proactive notification, and worldwide community of peers and HP experts.

If it becomes necessary to call for technical assistance, be prepared to do the following to ensure that your service call is handled properly:

- Be in front of your computer when you call.
- Write down the computer serial number, product ID number, and monitor serial number before calling.
- Spend time troubleshooting the problem with the service technician.
- Remove any hardware that was recently added to your system.
- Remove any software that was recently installed.
- Restore the system from the Recovery Disc Set that you created or restore the system to its original factory condition in System Software Requirement Disks (SSRD).

CAUTION: Restoring the system will erase all data on the hard drive. Be sure to back up all data files before running the restore process.

NOTE: For sales information and warranty upgrades (Care Packs), call your local authorized service provider or dealer.

Helpful Hints

If you encounter problems with the computer, monitor, or software, see the following list of general suggestions before taking further action:

- Check that the computer and monitor are plugged into a working electrical outlet.
- Check that the voltage select switch (some models) is set to the appropriate voltage for your region (115V or 230V).
- Check that the computer is turned on and the green power light is on.
- Check that the monitor is turned on and the green monitor light is on.
- Check the Power LED on the front of the computer to see if it is flashing red. The flashing lights are error codes that will help you diagnose the problem. Refer to Appendix A, POST Error Messages on page 164 for more information.
- Turn up the brightness and contrast controls of the monitor if the monitor is dim.
- Press and hold any key. If the system beeps, then the keyboard should be operating correctly.
- Check all cable connections for loose connections or incorrect connections.

- Wake the computer by pressing any key on the keyboard or pressing the power button. If the system remains in suspend mode, shut down the computer by pressing and holding the power button for at least four seconds then press the power button again to restart the computer. If the system will not shut down, unplug the power cord, wait a few seconds, then plug it in again. The computer will restart if it is set to power on automatically as soon as power is restored in Computer Setup. If it does not restart, press the power button to start the computer.
- Reconfigure the computer after installing a non-plug and play expansion board or other option. See Solving Hardware Installation Problems on page 140 for instructions.
- Be sure that all the needed device drivers have been installed. For example, if you are using a printer, you need a driver for that model printer.
- Remove all bootable media (CD/DVD or USB device) from the system before turning it on.
- If you have installed an operating system other than the factory-installed operating system, check to be sure that it is supported on the system.
- If the system has multiple video sources (embedded, PCI, or PCI-Express adapters) installed (embedded video on some models only) and a single monitor, the monitor must be plugged into the monitor connector on the source selected as the primary VGA adapter. During boot, the other monitor connectors are disabled and if the monitor is connected into these ports, the monitor will not function. You can select which source will be the default VGA source in Computer Setup.

⚠ **CAUTION:** When the computer is plugged into an AC power source, there is always voltage applied to the system board. You must disconnect the power cord from the power source before opening the computer to prevent system board or component damage.

Solving General Problems

You may be able to easily resolve the general problems described in this section. If a problem persists and you are unable to resolve it yourself or if you feel uncomfortable about performing the operation, contact an authorized dealer or reseller.

⚠ **WARNING!** When the computer is plugged into an AC power source, voltage is always applied to the system board. To reduce the risk of personal injury from electrical shock and/or hot surfaces, be sure to disconnect the power cord from the wall outlet and allow the internal system components to cool before touching.

Table 8-1 Solving General Problems

Computer appears locked up and will not turn off when the power button is pressed.

Cause	Solution
Software control of the power switch is not functional.	1. Press and hold the power button for at least four seconds until the computer turns off. 2. Disconnect the power cord from the electrical outlet.

Computer will not respond to keyboard or mouse.

Cause	Solution
Computer is in Sleep state.	To resume from Sleep state, press the power button. **CAUTION:** When attempting to resume from Sleep state, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data.
System has locked up.	Restart computer.

Computer date and time display is incorrect.

Cause	Solution
RTC (real-time clock) battery may need to be replaced. **NOTE:** Connecting the computer to a live AC outlet prolongs the life of the RTC battery.	Reset the date and time under **Control Panel** (Computer Setup can also be used to update the RTC date and time). If the problem persists, replace the RTC battery. See the Removal and Replacement section for instructions on installing a new battery, or contact an authorized dealer or reseller for RTC battery replacement. To access Control Panel in Windows 7, select **Start**, and then select **Control Panel**. To access Control Panel in Windows 8, from the Start screen, type c, and then select **Control Panel** from the list of applications.

Cursor will not move using the arrow keys on the keypad.

Cause	Solution
The Num Lock key is turned on.	Press the Num Lock key. The Num Lock light must be off if you want to use the arrow keys on the keypad. You can also disable or enable the Num Lock key in Computer Setup at **Advanced** > **Device Options**.

There is no sound or sound volume is too low.

Cause	Solution
System volume may be set low or muted.	1. Check the Computer Setup settings to make sure the internal system speaker is not muted (this setting does not affect the external speakers). 2. Make sure the external speakers are properly connected and powered on and that the speakers' volume control is set correctly. 3. Use the system volume control available in the operating system to make sure the speakers are not muted or to increase the volume.

Cannot remove computer cover or access panel.

Cause	Solution
Smart Cover Lock, featured on some computers, is locked.	Unlock the Smart Cover Lock using Computer Setup. In case of forgotten password, power loss, or computer malfunction, you must manually disable the Smart Cover lock . A key to unlock the Smart Cover Lock is not available from HP. Keys are typically available from a hardware store.

Poor performance.

Cause	Solution
Processor is too hot.	1. Make sure airflow to the computer is not blocked. Leave a 10.2-cm (4-inch) clearance on all vented sides of the computer and above the monitor to permit the required airflow. 2. Make sure fans are connected and working properly (some fans only operate when needed). 3. Make sure the processor heat sink is installed properly.
Hard drive is full.	Transfer data from the hard drive to create more space on the hard drive.
Low on memory.	Add more memory.
Hard drive fragmented.	Defragment hard drive.
Program previously accessed did not release reserved memory back to the system.	Restart the computer.

Table 8-1 Solving General Problems (continued)

Poor performance.

Cause	Solution
Virus resident on the hard drive.	Run virus protection program.
Too many applications running.	Windows 7: 1. Close unnecessary applications to free up memory. 2. Add more memory. 3. Some applications run in the background and can be closed by right-clicking on their corresponding icons in the task tray. To prevent these applications from launching at startup: In Windows 7: a. Go to **Start** > **All Programs** > **Accessories** > **Run** b. Type `msconfig`, and then press Enter. c. On the **Startup** tab of the System Configuration Utility, clear applications that you do not want to launch automatically, and the click **OK**. In Windows 8: a. On the Start screen, right-click, and then select the **All apps** icon. b. Under **Windows System**, click **Run**. c. Type `msconfig`, and then press Enter. d. On the **Startup** tab of the System Configuration Utility, clear applications that you do not want to launch automatically, and the click **OK**.
Some software applications, especially games, are stressful on the graphics subsystem.	1. Lower the display resolution for the current application or consult the documentation that came with the application for suggestions on how to improve performance by adjusting parameters in the application. 2. Add more memory. 3. Upgrade the graphics solution.
Cause unknown.	Restart the computer.

Computer powered off automatically and the Power LED flashes Red two times, once every second, followed by a two second pause, and the computer beeps two times. (Beeps stop after fifth iteration but LEDs continue flashing).

Cause	Solution
Processor thermal protection activated: A fan may be blocked or not turning. OR The heat sink is not properly attached to the processor.	1. Ensure that the computer air vents are not blocked and the processor cooling fan is running. 2. Open the access panel, press the power button, and see if the processor fan (or other system fan) spins. If the fan does not spin, make sure the fan cable is plugged onto the system board header. 3. If fan a plugged in and not spinning, replace it.

System does not power on and the LEDs on the front of the computer are not flashing.

Cause	Solution
System unable to power on.	Press and hold the power button for less than 4 seconds. If the hard drive LED turns green, then: 1. If equipped with a voltage selector, check that the voltage selector (located on the rear of the power supply) is set to the appropriate voltage. Proper voltage setting depends on your region. 2. Remove the expansion cards one at a time until the 5V_aux light on the system board turns on. 3. Replace the system board. OR Press and hold the power button for less than 4 seconds. If the hard drive LED does not turn on green then: 1. Check that the unit is plugged into a working AC outlet. 2. Open the access panel and check that the power button cable is properly connected to the system board. 3. Check that the power supply cables are properly connected to the system board. 4. Check to see if the 5V_aux light on the system board is turned on. If it is turned on, then replace the power button assembly. 5. If the 5V_aux light on the system board is off, then replace the power supply. 6. Replace the system board.

Solving Power Problems

Common causes and solutions for power problems are listed in the following table.

Table 8-2 Solving Power Problems

Power supply shuts down intermittently.

Cause	Solution
If equipped with a voltage selector, voltage selector switch on rear of computer chassis (some models) not switched to correct line voltage (115V or 230V).	Select the proper AC voltage using the selector switch.
Power supply will not turn on because of internal power supply fault.	Replace the power supply.

Computer powered off automatically and the Power LED flashes Red two times, once every second, followed by a two second pause, and the computer beeps two times. (Beeps stop after fifth iteration but LEDs continue flashing.)

Cause	Solution
Processor thermal protection activated: A fan may be blocked or not turning. OR The heat sink is not properly attached to the processor.	1. Ensure that the computer air vents are not blocked and the processor cooling fan is running. 2. Open the access panel, press the power button, and see if the processor fan (or other system fan) spins. If the fan does not spin, make sure the fan cable is plugged onto the system board header. 3. If fan a plugged in and not spinning, replace it.

Power LED flashes Red four times, once every second, followed by a two second pause, and the computer beeps four times. (Beeps stop after fifth iteration but LEDs continue flashing.)

Cause	Solution
Power failure (power supply is overloaded).	1. If equipped with a voltage selector, check that the voltage selector, located on the rear of the power supply (some models), is set to the appropriate voltage. Proper voltage setting depends on your region. 2. Open the access panel and ensure the power supply cable is seated into the connector on the system board. 3. Check if a device is causing the problem by removing ALL attached devices (such as hard drives or optical drives and expansion cards). Power on the system. If the system enters POST, then power off and replace one device at a time and repeat this procedure until failure occurs. Replace the device that is causing the failure. Continue adding devices one at a time to ensure all devices are functioning properly. 4. Replace the power supply. 5. Replace the system board.
The incorrect external power supply adapter is being used on the All-in One or USDT.	The power supply adapter must be at the correct power rating and use the Smart ID technology before the system will power up. Replace the power supply adapter with the HP-supplied power supply adapter.

Solving Hard Drive Problems

Table 8-3 Solving Hard Drive Problems

Hard drive error occurs.

Cause	Solution
Hard disk has bad sectors or has failed.	1. In Windows 7, click **Start**, click **Computer**, and right-click on a drive. Select **Properties**, and then select the **Tools** tab. Under **Error-checking** click **Check Now**. In Windows 8, on the Start screen type e, and then select **File Explorer** from the list of applications. In the left column, expand **Computer**, right-click on a drive, select **Properties**, and then select the **Tools** tab. Under **Error checking** click **Check**. 2. Use a utility to locate and block usage of bad sectors. If necessary, reformat the hard disk.

Disk transaction problem.

Cause	Solution
Either the directory structure is bad or there is a problem with a file.	In Windows 7, click **Start**, expand **Computer**, and right-click on a drive. Select **Properties**, and then select the **Tools** tab. Under **Error-checking** click **Check Now**. In Windows 8, on the Start screen type e, and then click **File Explorer** from the list of applications. In the left column, expand **Computer**, right-click on a drive, select **Properties**, and then select the **Tools** tab. Under **Error checking** click **Check**.

Drive not found (identified).

Cause	Solution
Cable could be loose.	Check cable connections.
The system may not have automatically recognized a newly installed device.	See reconfiguration directions in the Solving Hardware Installation Problems on page 140 section. If the system still does not recognize the new device, check to see if the device is listed within Computer Setup. If it is listed, the probable cause is a driver problem. If it is not listed, the probable cause is a hardware problem. If this is a newly installed drive, run the Computer Setup utility and try adding a POST delay under **Advanced** > **Power-On Options**.
The device is attached to a SATA port that has been hidden in Computer Setup.	Run the Computer Setup utility and ensure **Device Available** is selected for the device's SATA port in **Security** > **Device Security**.
Drive responds slowly immediately after power-up.	Run Computer Setup and increase the POST Delay in **Advanced** > **Power-On Options**.

Nonsystem disk/NTLDR missing message.

Cause	Solution
The system is trying to start from the hard drive but the hard drive may have been damaged.	1. Perform Drive Protection System (DPS) testing in system ROM.
System files missing or not properly installed.	1. Insert bootable media and restart the computer. 2. Boot to the windows installation media and select the recovery option. If only a restore kit is available, then select the **File Backup Program** option, and then restore the system. 3. Install system files for the appropriate operating system.
Hard drive boot has been disabled in Computer Setup.	Run the Computer Setup utility and enable the hard drive entry in the **Storage** > **Boot Order** list.
Bootable hard drive is not attached as first in a multi-hard drive configuration.	If attempting to boot from a hard drive, ensure it is attached to the system board dark blue SATA connector.
Bootable hard drive is not listed first in the Boot Order.	Run the Computer Setup utility and select **Storage** > **Boot Order** and ensure the bootable hard drive is listed immediately under the **Hard Drive** entry.

Computer will not boot from hard drive.

Cause	Solution
The device is attached to a SATA port that has been hidden in Computer Setup.	1. Check SATA cable connections. 2. Run the Computer Setup utility and ensure **Device Available** is selected for the device's SATA port in **Security** > **Device Security**.
Boot order is not correct.	Run the Computer Setup utility and change boot sequence in **Storage** > **Boot Order**.
Hard Drive's “Emulation Type” is set to “None.” (some models)	Run the Computer Setup utility and change the “Emulation Type” to “Hard Disk” in the device's details under **Storage** > **Device Configuration**.
Hard drive is damaged.	Observe if the front panel Power LED is blinking RED and if any beeps are heard. See Appendix A, POST Error Messages on page 164 to determine possible causes for the blinking red and beep codes. See the Worldwide Limited Warranty for terms and conditions.

Computer seems to be locked up.

Cause	Solution
Program in use has stopped responding to commands.	1. Use the task manager to close programs that do not respond. 2. Attempt the normal Windows “Shut Down” procedure. If this fails, press the power button for four or more seconds to turn off the power. To restart the computer, press the power button again.

Solving Media Card Reader Problems

Table 8-4 Solving Media Card Reader Problems

Media card will not work in a digital camera after formatting it in Windows.

Cause	Solution
By default, Windows will format any media card with a capacity greater than 32MB with the FAT32 format. Some digital cameras use the FAT (FAT16 & FAT12) format and can not operate with a FAT32 formatted card.	Either format the media card in the digital camera or select FAT file system to format the media card in a computer with Windows.

A write-protected or locked error occurs when attempting to write to the media card.

Cause	Solution
Media card is locked. Locking the media card is a safety feature that prevents writing to and deleting from an SD/ Memory Stick/PRO card.	If using an SD card, make sure that the lock tab located on the right of the SD card is not in the locked position. If using a Memory Stick/PRO card, make sure that the lock tab located on the bottom of the Memory Stick/PRO card is not in the locked position.

Can not write to the media card.

Cause	Solution
The media card is a read-only memory (ROM) card.	Check the manufacturer's documentation included with your card to see if it writable. Refer to the previous section for a list of compatible cards.
Media card is locked. Locking the media card is a safety feature that prevents writing to and deleting from an SD/ Memory Stick/PRO card.	If using an SD card, make sure that the lock tab located on the right of the SD card is not in the locked position. If using a Memory Stick/PRO card, make sure that the lock tab located on the bottom of the Memory Stick/PRO card is not in the locked position.

Unable to access data on the media card after inserting it into a slot.

Cause	Solution
The media card is not inserted properly, is inserted in the wrong slot, or is not supported.	Ensure that the card is inserted properly with the gold contact on the correct side. The green LED will light if inserted properly.

Do not know how to remove a media card correctly.

Cause	Solution
The computer's software is used to safely eject the card.	In Windows 7, click **Start**, select **Computer**, right-click on the corresponding drive icon, and then select **Eject**. Pull the card out of the slot. In Windows 8, on the Start screen, type e, and then click **File Explorer** from the list of applications. Expand **Computer**, right-click on the corresponding drive icon, and then select **Eject**. Pull the card out of the slot. **NOTE:** Never remove the card when the green LED is flashing

After installing the media card reader and booting to Windows, the reader and the inserted cards are not recognized by the computer.

Cause	Solution
The operating system needs time to recognize the device if the reader was just installed into the computer and you are turning the PC on for the first time.	Wait a few seconds so that the operating system can recognize the reader and the available ports, and then recognize the media inserted in the reader.

After inserting a media card in the reader, the computer attempts to boot from the media card.

Cause	Solution
The inserted media card has boot capability.	1. If you do not want to boot from the media card, remove it during boot or do not select the option to boot from the inserted media card during the boot process. 2. During POST (Power On Self-Test), press F9 to modify the boot menu. 3. Change the boot sequence in F10 Computer Setup.

Solving Display Problems

If you encounter display problems, see the documentation that came with the monitor and to the common causes and solutions listed in the following table.

Table 8-5 Solving Display Problems

Blank screen (no video).

Cause	Solution
Monitor is not turned on and the monitor light is not on.	Turn on the monitor and check that the monitor light is on.
Bad monitor.	Try a different monitor.
The cable connections are not correct.	Check the cable connection from the monitor to the computer and to the electrical outlet.
You may have a screen blanking utility installed or energy saver features are enabled.	Press any key or click the mouse button and type your password (if set).
System ROM is corrupted; system is running in Boot Block Emergency Recovery Mode (indicated by eight beeps).	Reflash the system ROM with the latest BIOS image.
You are using a fixed-sync monitor and it will not sync at the resolution chosen.	Be sure that the monitor can accept the same horizontal scan rate as the resolution chosen.
Computer is in Sleep state.	Press the power button to resume from Sleep state. **CAUTION:** When attempting to resume from Sleep state, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data.
Monitor cable is plugged into the wrong connector.	Systems may have a monitor connection on both the motherboard or an add-in card. Try moving the monitor connection to a different connector on the back of the computer
Monitor settings in the computer are not compatible with the monitor.	1. In Control Panel, select **Category** from the **View by** list, then under **Appearance and Personalization**, select **Adjust screen resolution**. To access Control Panel in Windows 7, click **Start**, and then select **Control Panel**. To access Control Panel in Windows 8, from the Start screen, type c, and then select **Control Panel** from the list of applications. 2. Expand the **Resolution** box, and then use the sliding control to reset the resolution.
Monitor is configured to use an input that is not active.	Use the monitor's on-screen menu controls to select the input that is being driven by the system. Refer to the monitor's user documentation for more information on the on-screen controls and settings.

Blank screen and the power LED flashes Red five times, once every second, followed by a two second pause, and the computer beeps five times. (Beeps stop after fifth iteration but LEDs continue flashing.)

Cause	Solution
Pre-video memory error.	1. Reseat DIMMs. Power on the system. 2. Replace DIMMs one at a time to isolate the faulty module. 3. Replace third-party memory with HP memory. 4. Replace the system board.

Blank screen and the power LED flashes Red six times, once every second, followed by a two second pause, and the computer beeps six times. (Beeps stop after fifth iteration but LEDs continue flashing.)

Cause	Solution
Pre-video graphics error.	For systems with a graphics card: 1. Reseat the graphics card (if applicable). Power on the system. 2. Replace the graphics card (if applicable). 3. Replace the system board. For systems with integrated graphics, replace the system board.

Blank screen and the power LED flashes Red seven times, once every second, followed by a two second pause, and the computer beeps seven times. (Beeps stop after fifth iteration but LEDs continue flashing.)

Cause	Solution
System board failure (ROM detected failure prior to video).	Replace the system board.

Monitor does not function properly when used with energy saver features.

Cause	Solution
Monitor without energy saver capabilities is being used with energy saver features enabled.	Disable monitor energy saver feature.

Dim characters.

Cause	Solution
The brightness and contrast controls are not set properly.	Adjust the monitor brightness and contrast controls.
Cables are not properly connected.	Check that the graphics cable is securely connected to the graphics card (if applicable) or video connector and the monitor.

Blurry video or requested resolution cannot be set.

Cause	Solution
If the graphics controller was upgraded, the correct graphics drivers may not be loaded.	Install the video drivers included in the upgrade kit.
Monitor is not capable of displaying requested resolution.	Change requested resolution.
Graphics card is bad.	Replace the graphics card.

The picture is broken up, rolls, jitters, or flashes.

Cause	Solution
The monitor connections may be incomplete or the monitor may be incorrectly adjusted.	1. Be sure the monitor cable is securely connected to the computer. 2. In a two-monitor system or if another monitor is in close proximity, be sure the monitors are not interfering with each other's electromagnetic field by moving them apart. 3. Fluorescent lights or fans may be too close to the monitor.
Monitor needs to be degaussed.	Degauss the monitor. Refer to the documentation that came with the monitor for instructions.

Image is not centered.

Cause	Solution
Position may need adjustment.	Press the monitor's Menu button to access the OSD menu. Select **ImageControl/ Horizontal Position** or **Vertical Position** to adjust the horizontal or vertical position of the image.

"No Connection, Check Signal Cable" displays on screen.

Cause	Solution
Monitor video cable is disconnected.	Connect the video cable between the monitor and computer. **CAUTION:** Ensure that the computer power is off while connecting the video cable.

“Out of Range” displays on screen.

Cause	Solution
Video resolution and refresh rate are set higher than what the monitor supports.	Restart the computer and enter Safe Mode. Change the settings to a supported setting then restart the computer so that the new settings take effect. To enter Safe Mode in Windows 7: 1. Restart the computer. 2. Press and hold the F8 key as your computer restarts, before the Windows logo appears. If the Windows logo appears, you must restart the computer and try again. 3. On the Advanced Boot Options screen, use the arrow keys to highlight the safe mode option you want, and then press Enter. 4. Log on to your computer with a user account that has administrator rights. When your computer is in safe mode, **Safe Mode** displays in the corners of your monitor. To exit safe mode, restart your computer and let Windows start normally. To enter Safe Mode in Windows 8: 1. Press the Windows logo + I to open the Settings charm. 2. Select **Change PC Settings**, select **General**, and then under **Advanced startup**, click **Restart now**. 3. Select **Troubleshoot**, select **Advanced options**, select **Startup Settings**, and then click **Restart**. 4. Use the function keys or number keys to select the safe mode option you want. When your computer is in safe mode, **Safe Mode** displays in the corners of your monitor. To exit safe mode, restart your computer and let Windows start normally.

High pitched noise coming from inside a flat panel monitor.

Cause	Solution
Brightness and/or contrast settings are too high.	Lower brightness and/or contrast settings.

Fuzzy focus; streaking, ghosting, or shadowing effects; horizontal scrolling lines; faint vertical bars; or unable to center the picture on the screen (flat panel monitors using an analog VGA input connection only).

Cause	Solution
Flat panel monitor's internal digital conversion circuits may be unable to correctly interpret the output synchronization of the graphics card.	1. Select the monitor's Auto-Adjustment option in the monitor's on-screen display menu. 2. Manually synchronize the Clock and Clock Phase on-screen display functions. To download a SoftPaq that will assist you with the synchronization, go to the following Web site, select the appropriate monitor, and download either SP32347 or SP32202: http://www.hp.com/support
Graphics card is not seated properly or is bad (some models).	1. Reseat the graphics card. 2. Replace the graphics card.

Certain typed symbols do not appear correct.

Cause	Solution
The font you are using does not support that particular symbol.	Use the Character Map to locate and select the appropriate symbol. You can copy the symbol from the Character Map into a document. In Windows 7, click **Start**, select **All Programs**, select **Accessories**, select **System Tools**, and then select **Character Map**. In Windows 8, on the Start screen, type `ch`, and then select **Character Map** from the list of applications.

Solving Audio Problems

If the computer has audio features and you encounter audio problems, see the common causes and solutions listed in the following table.

Table 8-6 Solving Audio Problems

Sound cuts in and out.

Cause	Solution
Processor resources are being used by other open applications.	Shut down all open processor-intensive applications.

Sound does not come out of the speaker or headphones.

Cause	Solution
Software volume control is turned down or muted.	Double-click the **Speaker** icon on the taskbar, then make sure that **Mute** is not selected and use the volume slider to adjust the volume. **NOTE:** In Windows 8, the taskbar is available at the bottom of the Desktop screen.
Audio is hidden in Computer Setup.	Enable the audio in Computer Setup: **Security** > **Device Security** > **System Audio**.
The external speakers are not turned on.	Turn on the external speakers.
The audio device may be connected to the wrong jack.	Ensure that the device is connected to the correct jack on the computer. The rear audio jack output is the green receptacle. The speakers should be plugged into the line-out jack and the headphones should be plugged into the headphone jack.
External speakers plugged into the wrong audio jack on a recently installed sound card.	See the sound card documentation for proper speaker connection. The rear audio jack output is the green receptacle.
Headphones or devices connected to the line-out connector mute the internal speaker.	Turn on and use headphones or external speakers, if connected, or disconnect headphones or external speakers.
Computer is in Sleep state.	Press the power button to resume from Sleep state. **CAUTION:** When attempting to resume from Sleep state, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data.
Internal speaker is disabled in Computer Setup.	Enable the internal speaker in Computer Setup. Select **Advanced** > **Device Options** > **Internal Speaker**.
The application is set to use a different audio device than speakers.	Some graphics cards support audio over the DisplayPort connection (if applicable), so multiple audio devices may be listed in Device Manager. Make sure the correct device is being used. To access Device Manager in Windows 7, click **Start**, select **Control Panel**, and then select **Device Manager**. To access Device Manager in Windows 8, from the Start screen, type c, select **Control Panel** from the list of applications, and then select **Device Manager**.

Table 8-6 Solving Audio Problems (continued)

Sound does not come out of the speaker or headphones.

Cause	Solution
Some applications can select which audio output device is used.	Make sure the application has selected the correct audio device.
The operating system controls may be set to use a different audio device as the default output device than what is expected.	Set the operating system to use the correct audio device.

Sound from headphones is not clear or muffled.

Cause	Solution
Headphones are plugged into the rear audio output connector. The rear audio output connector is for powered audio devices and is not designed for headphone use.	Plug the headphones into the headphone connector on the front of the computer.

Computer appears to be locked up while recording audio.

Cause	Solution
The hard disk may be full.	Before recording, make sure there is enough free space on the hard disk. You can also try recording the audio file in a compressed format.

Line-in jack is not functioning properly.

Cause	Solution
Jack has been reconfigured in the audio driver or application software.	In the audio driver or application software, reconfigure the jack or set the jack to its default value.

There is no sound or sound volume is too low.

Cause	Solution
The application is set to use a different audio device than speakers.	Some graphics cards support audio over the DisplayPort connection (if applicable), so multiple audio devices may be listed in Device Manager. Make sure the correct device is being used. To access Device Manager in Windows 7, click **Start**, select **Control Panel**, and then select **Device Manager**. To access Device Manager in Windows 8, from the Start screen, type c, select **Control Panel** from the list of applications, and then select **Device Manager**.

Table 8-6 Solving Audio Problems (continued)

There is no sound or sound volume is too low.

Cause	Solution
Some applications can select which audio output device is used.	Make sure the application has selected the correct audio device.
The operating system controls may be set to use a different audio device as the default output device than what is expected.	Set the operating system to use the correct audio device.

Solving Printer Problems

If you encounter printer problems, see the documentation that came with the printer and to the common causes and solutions listed in the following table.

Table 8-7 Solving Printer Problems

Printer will not print.

Cause	Solution
Printer is not turned on and online.	Turn the printer on and make sure it is online.
The correct printer drivers for the application are not installed.	1. Install the correct printer driver for the application. 2. Try printing using the MS-DOS command: `DIR C:\ > [printer port]` where `[printer port]` is the address of the printer being used. If the printer works, reload the printer driver. To run MS-DOS commands, press the Windows key + r, type `cmd` in the **Open** box, and then click **OK**.
If you are on a network, you may not have made the connection to the printer.	Make the proper network connections to the printer.
Printer may have failed.	Run printer self-test.

Printer will not turn on.

Cause	Solution
The cables may not be connected properly.	Reconnect all cables and check the power cord and electrical outlet.

Printer prints garbled information.

Cause	Solution
The correct printer driver for the application is not installed.	Install the correct printer driver for the application.

Table 8-7 Solving Printer Problems (continued)

Printer prints garbled information.

Cause	Solution
The cables may not be connected properly.	Reconnect all cables.
Printer memory may be overloaded.	Reset the printer by turning it off for one minute, then turn it back on.

Printer will not print.

Cause	Solution
The printer may be out of paper.	Check the paper tray and refill it if it is empty.

Solving Keyboard and Mouse Problems

If you encounter keyboard or mouse problems, see the documentation that came with the equipment and to the common causes and solutions listed in the following table.

Table 8-8 Solving Keyboard Problems

A wireless keyboard/mouse is not working correctly. Symptoms include lagging mouse movement, jumpy mouse/keyboard, or no function of mouse/keyboard and external drive.

Cause	Solution
If your computer is equipped with USB 3.0 ports, connected USB 3.0 devices can interfere with the wireless keyboard USB receiver.	Connect the wireless keyboard USB receiver to a USB 2.0 port that is separated from ports with USB 3.0 devices. If you still experience interference, you may have to place the connectors farther apart using an external USB hub.

Keyboard commands and typing are not recognized by the computer.

Cause	Solution
Keyboard connector is not properly connected.	Shut down the computer, reconnect the keyboard to the back of the computer, and then restart the computer.
Program in use has stopped responding to commands.	Shut down your computer using the mouse and then restart the computer.
Keyboard needs repairs.	See the Worldwide Limited Warranty for terms and conditions.
Computer is in Sleep state.	Press the power button to resume from Sleep state. **CAUTION:** When attempting to resume from Sleep date, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data.

Cursor will not move using the arrow keys on the keypad.

Cause	Solution
The Num Lock key is on.	Press the Num Lock key. The Num Lock light should be off if you want to use the arrow keys on the keypad. You can disable or enable the Num Lock key in Computer Setup at **Advanced** > **Device Options**.

Table 8-9 Solving Mouse Problems

Mouse does not respond to movement or is too slow.

Cause	Solution
Mouse connector is not properly plugged into the back of the computer.	Shut down the computer using the keyboard. Windows 7: 1. Press the Ctrl and Esc keys at the same time (or press the Windows logo key) to display the **Start** menu. 2. Use the arrow keys to select **Shut Down** and then press Enter. 3. After the shutdown is complete, plug the mouse connector into the back of the computer (or the keyboard) and restart. Windows 8: 1. Press the Windows logo + I to open the Settings charm. 2. Use the arrow keys to select **Power**, and then press Enter. 3. Use the arrow keys to select **Shut Down**, and then press Enter. 4. After the shutdown is complete, plug the mouse connector into the back of the computer (or the keyboard) and restart.
Program in use has stopped responding to commands.	Shut down the computer using the keyboard then restart the computer.
Mouse may need cleaning.	Remove the roller ball cover on the mouse and clean the internal components.
Mouse may need repair.	See the Worldwide Limited Warranty for terms and conditions.
Computer is in Sleep state.	Press the power button to resume from Sleep state. **CAUTION:** When attempting to resume from Sleep state, do not hold down the power button for more than four seconds. Otherwise, the computer will shut down and you will lose any unsaved data.

Mouse will only move vertically, horizontally, or movement is jerky.

Cause	Solution
Mouse roller ball or the rotating encoder shafts that make contact with the ball are dirty.	Remove roller ball cover from the bottom of the mouse and clean the internal components with a mouse cleaning kit available from most computer stores.

Solving Hardware Installation Problems

You may need to reconfigure the computer when you add or remove hardware, such as an additional drive or expansion card. If you install a plug and play device, Windows automatically recognizes the device and configures the computer. If you install a non-plug and play device, you must reconfigure the computer after completing installation of the new hardware. In Windows, use the **Add Hardware Wizard** and follow the instructions that appear on the screen.

To open the Add Hardware Wizard, open a Command Prompt and open hdwwiz.exe.

⚠ **WARNING!** When the computer is plugged into an AC power source, voltage is always applied to the system board. To reduce the risk of personal injury from electrical shock and/or hot surfaces, be sure to disconnect the power cord from the wall outlet and allow the internal system components to cool before touching.

Table 8-10 Solving Hardware Installation Problems

A new device is not recognized as part of the system.

Cause	Solution
Device is not seated or connected properly.	Ensure that the device is properly and securely connected and that pins in the connector are not bent down.
Cable(s) of new external device are loose or power cables are unplugged.	Ensure that all cables are properly and securely connected and that pins in the cable or connector are not bent down.
Power switch of new external device is not turned on.	Turn off the computer, turn on the external device, then turn on the computer to integrate the device with the computer system.
When the system advised you of changes to the configuration, you did not accept them.	Reboot the computer and follow the instructions for accepting the changes.
A plug and play board may not automatically configure when added if the default configuration conflicts with other devices.	Use Windows Device Manager to deselect the automatic settings for the board and choose a basic configuration that does not cause a resource conflict. You can also use Computer Setup to reconfigure or disable devices to resolve the resource conflict. To access Device Manager in Windows 7, click **Start**, select **Control Panel**, and then select **Device Manager**. To access Device Manager in Windows 8, from the Start screen, type c, select **Control Panel** from the list of applications, and then select **Device Manager**.
USB ports on the computer are disabled in Computer Setup.	Run the Computer Setup utility and ensure that **Device available** is selected for appropriate USB ports under **Security > USB Security**.

Computer will not start.

Cause	Solution
Wrong memory modules were used in the upgrade or memory modules were installed in the wrong location.	1. Review the documentation that came with the system to determine if you are using the correct memory modules and to verify the proper installation. **NOTE:** DIMM1 or XMM1 must always be installed. On all computers except the USDT, DIMM1 must be installed before DIMM2, and DIMM3 must be installed before DIMM4. 2. Observe the beeps and LED lights on the front of the computer. Beeps and flashing LEDs are codes for specific problems. 3. If you still cannot resolve the issue, contact Customer Support.

Power LED flashes Red five times, once every second, followed by a two second pause, and the computer beeps five times. (Beeps stop after fifth iteration but LEDs continue flashing.)

Cause	Solution
Memory is installed incorrectly or is bad.	**CAUTION:** To avoid damage to the DIMMs or the system board, you must unplug the computer power cord before attempting to reseat, install, or remove a DIMM module. 1. Reseat DIMMs. Power on the system. 2. Replace DIMMs one at a time to isolate the faulty module. **NOTE:** DIMM1 or XMM1 must always be installed. On all computers except the USDT, DIMM1 must be installed before DIMM2, and DIMM3 must be installed before DIMM4 3. Replace third-party memory with HP memory. 4. Replace the system board.

Power LED flashes Red six times, once every second, followed by a two second pause, and the computer beeps six times. (Beeps stop after fifth iteration but LEDs continue flashing.)

Cause	Solution
Graphics card (some models) is not seated properly or is bad, or system board is bad.	For systems with a graphics card: 1. Reseat the graphics card. Power on the system. 2. Replace the graphics card. 3. Replace the system board. For systems with integrated graphics, replace the system board.

Power LED flashes Red ten times, once every second, followed by a two second pause, and the computer beeps ten times. (Beeps stop after fifth iteration but LEDs continue flashing.)

Cause	Solution
Bad option card.	1. Check each option card by removing the cards one at time (if multiple cards), then power on the system to see if fault goes away. 2. Once bad card is identified, remove and replace bad option card. 3. Replace the system board.

Solving Network Problems

Some common causes and solutions for network problems are listed in the following table. These guidelines do not discuss the process of debugging the network cabling.

Table 8-11 Solving Network Problems

Wake-on-LAN feature is not functioning.

Cause	Solution
S5 Maximum Power Saving feature is enabled.	Disable the S5 Maximum Power Saving option in Computer Setup. Select **Power > Hardware Power Management > S5 Maximum Power Savings**.
S5 Wake on LAN is disabled (some models).	Enable the S5 Wake on LAN option in Computer Setup. Select **Advanced** > **Device Options** > **S5 Wake on LAN**.
Wake-on-LAN is not enabled.	To enable Wake-on-LAN in Windows 7: 1. Select **Start** > **Control Panel** > **Network and Sharing Center**. 2. Under **Tasks**, select **Manage network connections**. 3. Click **Local Area Connection**. 4. Click the **Properties** button. 5. Click the **Configure** button. 6. Click the **Power Management** tab, then select **Allow this device to wake the computer**. To enable Wake-on-LAN in Windows 8: 1. From the Start screen, type c, and then select **Control Panel** from the list of applications. 2. Select **Network and Sharing Center**, and then click the **Ethernet** link next to the connection. 3. Click the **Properties** button. 4. Click the **Configure** button. 5. Click the **Power Management** tab, then enable the appropriate Wake-on LAN option.

Network driver does not detect network controller.

Cause	Solution
Network controller is disabled.	1. Run Computer Setup and enable network controller. 2. Enable the network controller in the operating system using Device Manager. To access Device Manager in Windows 7, click **Start**, select **Control Panel**, and then select **Device Manager**. To access Device Manager in Windows 8, from the Start screen, type c, select **Control Panel** from the list of applications, and then select **Device Manager**.
Incorrect network driver.	Check the network controller documentation for the correct driver or obtain the latest driver from the manufacturer's Web site.

Network status link light never flashes.

NOTE: The network status light is supposed to flash when there is network activity.

Cause	Solution
No active network is detected.	Check cabling and network equipment for proper connection.
Network controller is not set up properly.	Check for the device status within Windows, such as Device Manager for driver load and the Network Connections applet within Windows for link status. To access Device Manager in Windows 7, click **Start**, select **Control Panel**, and then select **Device Manager**. To access Device Manager in Windows 8, from the Start screen, type c, select **Control Panel** from the list of applications, and then select **Device Manager**.
Network controller is disabled.	1. Run Computer Setup and enable network controller. 2. Enable the network controller in the operating system using Device Manager. To access Device Manager in Windows 7, click **Start**, select **Control Panel**, and then select **Device Manager**. To access Device Manager in Windows 8, from the Start screen, type c, select **Control Panel** from the list of applications, and then select **Device Manager**.
Network driver is not properly loaded.	Reinstall network drivers.
System cannot autosense the network.	Disable auto-sensing capabilities and force the system into the correct operating mode.

Diagnostics reports a failure.

Cause	Solution
The cable is not securely connected.	Ensure that the cable is securely attached to the network connector and that the other end of the cable is securely attached to the correct device.
The cable is attached to the incorrect connector.	Ensure that the cable is attached to the correct connector.
There is a problem with the cable or a device at the other end of the cable.	Ensure that the cable and device at the other end are operating correctly.
Network controller interrupt is shared with an expansion board.	Under the Computer Setup **Advanced** menu, change the resource settings for the board.
The network controller is defective.	Contact an authorized service provider.

Diagnostics passes, but the computer does not communicate with the network.

Cause	Solution
Network drivers are not loaded, or driver parameters do not match current configuration.	Make sure the network drivers are loaded and that the driver parameters match the configuration of the network controller. Make sure the correct network client and protocol is installed.
The network controller is not configured for this computer.	Select the **Network and Sharing Center** icon in the **Control Panel** and configure the network controller. To access Control Panel in Windows 7, click **Start**, and then select **Control Panel**. To access Control Panel in Windows 8, from the Start screen, type c, and then select **Control Panel**.

Network controller stopped working when an expansion board was added to the computer.

Cause	Solution
Network controller interrupt is shared with an expansion board.	Under the Computer Setup **Advanced** menu, change the resource settings for the board.
The network controller requires drivers.	Verify that the drivers were not accidentally deleted when the drivers for a new expansion board were installed.
The expansion board installed is a network card (NIC) and conflicts with the embedded NIC.	Under the Computer Setup **Advanced** menu, change the resource settings for the board.

Network controller stops working without apparent cause.

Cause	Solution
The files containing the network drivers are corrupted.	Reinstall the network drivers using the Recovery Disc Set in Windows 7 or Windows recovery tools in Windows 8. If necessary, download the softpaq from the web (from a different computer).

Table 8-11 Solving Network Problems (continued)

Network controller stops working without apparent cause.

Cause	Solution
The cable is not securely connected.	Ensure that the cable is securely attached to the network connector and that the other end of the cable is securely attached to the correct device.
The network controller is defective.	Contact an authorized service provider.

New network card will not boot.

Cause	Solution
New network card may be defective or may not meet industry-standard specifications.	Install a working, industry-standard NIC, or change the boot sequence to boot from another source.

Cannot connect to network server when attempting Remote System Installation.

Cause	Solution
The network controller is not configured properly.	Verify Network Connectivity, that a DHCP Server is present, and that the Remote System Installation Server contains the NIC drivers for your NIC.

System setup utility reports unprogrammed EEPROM.

Cause	Solution
Unprogrammed EEPROM.	Contact an authorized service provider.

Solving Memory Problems

If you encounter memory problems, some common causes and solutions are listed in the following table.

CAUTION: Power may still be supplied to the DIMMs when the computer is turned off (depending on the Management Engine (ME) settings). To avoid damage to the DIMMs or the system board, you must unplug the computer power cord before attempting to reseat, install, or remove a memory module.

For those systems that support ECC memory, HP does not support mixing ECC and non-ECC memory. Otherwise, the computer will not boot the operating system.

NOTE: The memory count will be affected by configurations with the Management Engine (ME) enabled. The ME uses 8MB of system memory in single channel mode or 16MB of memory in dual-channel mode to download, decompress, and execute the ME firmware for Out-of-Band (OOB), third-party data storage, and other management functions.

Table 8-12 Solving Memory Problems

System will not boot or does not function properly after installing additional memory modules.

Cause	Solution
A memory module is not installed in the DIMM1 or XMM1 socket.	Ensure that a memory module is installed in the DIMM1 or XMM1 socket on the system board. This socket must be populated with a memory module.
Memory module is not the correct type or speed grade for the system or the new memory module is not seated properly.	Replace module with the correct industry-standard device for the computer. On some models, ECC and non-ECC memory modules cannot be mixed.

Out of memory error.

Cause	Solution
You have run out of memory to run the application.	Check the application documentation to determine the memory requirements.

Memory count during POST is wrong.

Cause	Solution
The memory modules may not be installed correctly.	Check that the memory modules have been installed correctly and that proper modules are used.
Integrated graphics may use system memory.	No action required.

Insufficient memory error during operation.

Cause	Solution
Too many Terminate and Stay Resident programs (TSRs) are installed.	Delete any TSRs that you do not need.
You have run out of memory for the application.	Check the memory requirements for the application or add more memory to the computer.

Power LED flashes Red five times, once every second, followed by a two second pause, and the computer beeps five times. (Beeps stop after fifth iteration but LEDs continue flashing.)

Cause	Solution
Memory is installed incorrectly or is bad.	1. Reseat DIMMs. Power on the system. 2. Replace DIMMs one at a time to isolate the faulty module. 3. Replace third-party memory with HP memory. 4. Replace the system board.

Solving Processor Problems

If you encounter processor problems, common causes and solutions are listed in the following table.

Table 8-13 Solving Processor Problems

Poor performance is experienced.

Cause	Solution
Processor is hot.	1. Make sure the airflow to the computer is not blocked. 2. Make sure the fans are connected and working properly (some fans only operate when needed). 3. Make sure the processor heat sink is installed properly.

Power LED flashes Red three times, once every second, followed by a two second pause.

Cause	Solution
Processor is not seated properly or not installed.	1. Check to see that the processor is present. 2. Reseat the processor.

Power LED flashes Red eleven times, once every second, followed by a two second pause.

Cause	Solution
The current processor does not support a feature previously enabled on this system.	1. Install a TXT (Trusted Execution Technology) capable processor. 2. Disable TXT in the Computer Setup (F10) utility. 3. Reinstall the original processor.

Solving CD-ROM and DVD Problems

If you encounter CD-ROM or DVD problems, see the common causes and solutions listed in the following table or to the documentation that came with the optional device.

Table 8-14 Solving CD-ROM and DVD Problems

System will not boot from CD-ROM or DVD drive.

Cause	Solution
The device is attached to a SATA port that has been hidden in the Computer Setup utility.	Run the Computer Setup utility and ensure **Device Available** is selected for the device's SATA port in **Security** > **Device Security**.
Removable Media Boot is disabled in the Computer Setup utility.	Run the Computer Setup utility and enable booting to removable media in **Storage** > **Storage Options**. Ensure CD-ROM is enabled in **Storage** > **Boot Order**.

Table 8-14 Solving CD-ROM and DVD Problems (continued)

System will not boot from CD-ROM or DVD drive.

Cause	Solution
Network Boot is enabled in Computer Setup.	Run the Computer Setup utility and disable Network Boot in **Security** > **Network Boot**.
Non-bootable CD in drive.	Try a bootable CD in the drive.
Boot order not correct.	Run the Computer Setup utility and change boot sequence in **Storage** > **Boot Order**.

Drive not found (identified).

Cause	Solution
Cable could be loose.	Check cable connections.
The system may not have automatically recognized a newly installed device.	See reconfiguration directions in the Solving Hardware Installation Problems on page 140 section. If the system still does not recognize the new device, check to see if the device is listed within Computer Setup. If it is listed, the probable cause is a driver problem. If it is not listed, the probable cause is a hardware problem. If this is a newly installed drive, run the Computer Setup utility and try adding a POST delay under **Advanced** > **Power-On Options**.
The device is attached to a SATA port that has been hidden in Computer Setup.	Run the Computer Setup utility and ensure **Device Available** is selected for the device's SATA port in **Security** > **Device Security**.
Drive responds slowly immediately after power-up.	Run Computer Setup and increase the POST Delay in **Advanced** > **Power-On Options**.

CD-ROM or DVD devices are not detected or driver is not loaded.

Cause	Solution
Drive is not connected properly or not properly configured.	See the documentation that came with the optional device.

Movie will not play in the DVD drive.

Cause	Solution
Movie may be regionalized for a different country.	See the documentation that came with the DVD drive.
Decoder software is not installed.	Install decoder software.
Damaged media.	Replace media.
Movie rating locked out by parental lock.	Use DVD software to remove parental lock.
Media installed upside down.	Reinstall media.

Cannot eject compact disc (tray-load unit).

Cause	Solution
Disc not properly seated in the drive.	Turn off the computer and insert a thin metal rod into the emergency eject hole and push firmly. Slowly pull the tray out from the drive until the tray is fully extended, then remove the disc.

CD-ROM, CD-RW, DVD-ROM, or DVD-R/RW drive cannot read a disc or takes too long to start.

Cause	Solution
Media is corrupt.	Try different media to confirm whether media is valid.
Media has been inserted upside down.	Re-insert the media with the label facing up.
The DVD-ROM drive takes longer to start because it has to determine the type of media played, such as audio or video.	Wait at least 30 seconds to let the DVD-ROM drive determine the type of media being played. If the disc still does not start, read the other solutions listed for this topic.
CD or DVD disc is dirty.	Clean CD or DVD with a CD cleaning kit, available from most computer stores.
Windows does not detect the CD-ROM or DVD-ROM drive.	1. Use Device Manager to remove or uninstall the device. To access Device Manager in Windows 7, click **Start**, select **Control Panel**, and then select **Device Manager**. To access Device Manager in Windows 8, from the Start screen, type c, select **Control Panel** from the list of applications, and then select **Device Manager**. 2. Restart the computer and let Windows detect the CD or DVD driver.

Recording or copying CDs is difficult or impossible.

Cause	Solution
Wrong or poor quality media type.	1. Try using a slower speed when recording. 2. Verify that you are using the correct media for the drive. 3. Try a different brand of media. Quality varies widely between manufacturers.

Solving USB Flash Drive Problems

If you encounter USB flash drive problems, common causes and solutions are listed in the following table.

Table 8-15 Solving USB Flash Drive Problems

USB flash drive is not seen as a drive letter in Windows.

Cause	Solution
The drive letter after the last physical drive is not available.	Change the default drive letter for the flash drive in Windows.

USB flash drive not found (identified).

Cause	Solution
The device is attached to a USB port that has been hidden in Computer Setup.	Run the Computer Setup utility and enable USB ports in **Security** > **USB Security**.
The device was not properly seated before power-up.	Ensure the device is fully inserted into the USB port before applying power to the system

System will not boot from USB flash drive.

Cause	Solution
Boot order is not correct.	Run the Computer Setup utility and change boot sequence in **Storage** > **Boot Order**.
Removable Media Boot is disabled in the Computer Setup utility.	Run the Computer Setup utility and enable booting to removable media in **Storage** > **Storage Options**. Ensure USB is enabled in **Storage** > **Boot Order**.

The computer boots to DOS after making a bootable flash drive.

Cause	Solution
Flash drive is bootable.	Install the flash drive only after the operating system boots.
Flash drive is defective.	Try a different flash drive.

Solving Front Panel Component Problems

If you encounter problems with devices connected to the front panel, refer to the common causes and solutions listed in the following table.

A USB device, headphone, or microphone is not recognized by the computer.

Cause	Solution
Device is not properly connected.	1. Turn off the computer. 2. Reconnect the device to the front of the computer and restart the computer.
The device does not have power.	If the USB device requires AC power, be sure one end is connected to the device and one end is connected to a live outlet.
The correct device driver is not installed.	1. Install the correct driver for the device. 2. You might need to reboot the computer.
The cable from the device to the computer does not work.	1. If possible, replace the cable. 2. Restart the computer.
The device is not working.	1. Replace the device. 2. Restart the computer.
USB ports on the computer are disabled in Computer Setup.	Run the Computer Setup utility and ensure that the USB ports are set to **Enabled** in **Security > USB Security**.

Solving Internet Access Problems

If you encounter Internet access problems, consult your Internet Service Provider (ISP) or refer to the common causes and solutions listed in the following table.

Unable to connect to the Internet.

Cause	Solution
Internet Service Provider (ISP) account is not set up properly.	Verify Internet settings or contact your ISP for assistance.
Web browser is not set up properly.	Verify that the Web browser is installed and set up to work with your ISP.
Cable/DSL modem is not plugged in.	Plug in cable/DSL modem. You should see a “power” LED light on the front of the cable/DSL modem.
Cable/DSL service is not available or has been interrupted due to bad weather.	Try connecting to the Internet at a later time or contact your ISP. (If the cable/DSL service is connected, the “cable” LED light on the front of the cable/DSL modem will be on.)
The CAT5 UTP cable is disconnected.	Connect the CAT5 UTP cable between the cable modem and the computers’s RJ-45 connector. (If the connection is good, the “PC” LED light on the front of the cable/DSL modem will be on.)

Unable to connect to the Internet.

Cause	Solution
IP address is not configured properly.	Contact your ISP for the correct IP address.
Cookies are corrupted. (A “cookie” is a small piece of information that a Web server can store temporarily with the Web browser. This is useful for having the browser remember some specific information that the Web server can later retrieve.)	Windows 7: 1. Select **Start** > **Control Panel**. 2. Click **Internet Options**. 3. In the **Browsing history** section on the **General** tab, click the **Delete** button. 4. Select the **Cookies** check box and click the **Delete** button. Windows 8: 1. From the Start screen, type c, and then select **Control Panel** from the list of applications.. 2. Click **Internet Options**. 3. In the **Browsing history** section on the **General** tab, click the **Delete** button. 4. Select the **Cookies** check box and click the **Delete** button.

Cannot automatically launch Internet programs.

Cause	Solution
You must log on to your ISP before some programs will start.	Log on to your ISP and launch the desired program.

Solving Software Problems

Most software problems occur as a result of the following:

- The application was not installed or configured correctly.
- There is insufficient memory available to run the application.
- There is a conflict between applications.
- Be sure that all the needed device drivers have been installed.
- If you have installed an operating system other than the factory-installed operating system, check to be sure it is supported on the system.

If you encounter software problems, see the applicable solutions listed in the following table.

Computer will not continue and the HP logo does not display.

Cause	Solution
ROM issue - POST error has occurred.	Observe the beeps and LED lights on the front of the computer. See Appendix A, POST Error Messages on page 164 to determine possible causes. See the Worldwide Limited Warranty for terms and conditions.

Computer will not continue after HP logo screen displays.

Cause	Solution
System files may be damaged.	In Windows 7, use recovery media to scan hard drive for errors, or use Windows Startup Repair to fix problems that might prevent Windows from starting correctly. Windows Startup Repair is one of the recovery tools in the System Recovery Options menu. You can also create a system repair disc that contains the System Recovery Options menu. If the problem is severe enough that Startup Repair doesn't start on its own and you can't access the System Recovery Options menu on your computer's hard disk, you can get to the menu and start Startup Repair by using the Windows installation disc or a system repair disc that you created earlier. In Windows 8, use Automatic Repair to fix problems that might prevent Windows from starting correctly. To access Automatic Repair: 1. Press the Windows logo + I to open the Settings charm. 2. Select **Change PC Settings**, select **General**, and then under **Advanced startup**, click **Restart now**. 3. Select **Troubleshoot**, select **Advanced options**, and then select **Automatic Repair**. Windows starts Automatic Repair. 4. Select the account to use to begin Automatic Repair, and type the password for the account. Windows diagnoses the computer and attempts the repair it.

“Illegal Operation has Occurred” error message is displayed.

Cause	Solution
Software being used is not Microsoft-certified for your version of Windows.	Verify that the software is certified by Microsoft for your version of Windows (see program packaging for this information).
Configuration files are corrupt.	If possible, save all data, close all programs, and restart the computer.

Contacting Customer Support

For help and service, contact an authorized reseller or dealer. To locate a reseller or dealer near you, visit http://www.hp.com.

NOTE: If you take the computer to an authorized reseller, dealer, or service provider for service, remember to provide the setup and power-on passwords if they are set.

Refer to the number listed in the warranty or in the *Support Telephone Numbers* guide for technical assistance.

9 Backup and Recovery

Restoring and recovering in Windows 7

To protect from loss or damage, back up your personal data files. Refer to the operating system or backup utility documentation for instructions on making backup copies of your data files.

To protect the software from loss or damage, keep a backup copy of all system software, applications, and related files stored on the hard drive.

If you cannot create system recovery CDs or DVDs, you can order a recovery disk set from support. To obtain the support telephone number for your region, see http://www.hp.com/support/contactHP.

System Restore

If you have a problem that might be due to software that you installed on your computer, use System Restore to return the computer to a previous restore point. You can also set restore points manually.

NOTE: Always use this System Restore procedure before you use the System Recovery feature.

NOTE: Some features might not be available on systems that are shipped without a Windows operating system.

To start System Restore:

1. Close all open programs.
2. Click the **Start** button, right-click **Computer**, and then click **Properties**.
3. Click **System protection**, **System Restore**, click **Next**, and then follow the on-screen instructions.

To add restore points manually:

1. Close all open programs.
2. Click the **Start** button, right-click **Computer**, click **Properties**, and then click **System protection**.
3. Under **Protection Settings**, select the disk for which you want to create a restore point.
4. Click **Create**, and then follow the on-screen instructions.

System Recovery

WARNING! This procedure will delete all user information. To prevent loss of information, be sure to back up all user information so you can restore it after recovery.

System Recovery completely erases and reformats the hard disk drive, deleting all data files that you have created, and then reinstalls the operating system, programs, and drivers. However, you must reinstall any software that was not installed on the computer at the factory. This includes software that came on media included in the computer accessory box, and any software programs you installed after purchase.

NOTE: Always use the System Restore procedure before you use the System Recovery program. See System Restore on page 156.

NOTE: Some features might not be available on systems that are shipped without a Windows operating system.

You must choose one of the following methods to perform a System Recovery:

- Recovery image — Run System Recovery from a recovery image stored on your hard disk drive. The recovery image is a file that contains a copy of the original factory-shipped software. To perform a System Recovery from a recovery image, see System Recovery when Windows is responding on page 157 or System Recovery when Windows is not responding on page 158.
- Recovery media — Run System Recovery from recovery media that you have created from files stored on your hard disk drive or purchased separately. To create recovery media, see System recovery using recovery media on page 158.

System Recovery when Windows is responding

CAUTION: System Recovery deletes all data and programs you created or installed. Before you begin, back up any important data to a CD or DVD or to a USB flash drive.

NOTE: In some cases, you must use recovery media for this procedure. To create this media, follow the instructions in Creating recovery media on page 159.

If the computer is working and Windows 7 is responding, use these steps to perform a System Recovery.

1. Turn off the computer.
2. Disconnect all peripheral devices from the computer except the monitor, keyboard, and mouse.
3. Turn on the computer.
4. When Windows has loaded, click the **Start** button, click **All Programs**, click **Security and Protection**, click **Recovery Manager**, and then click **Recovery Manager**. If prompted, click **Yes** to allow the program to continue.
5. Under **I need help immediately**, click **System Recovery**.
6. Select **Yes**, and then click **Next**. Your computer restarts.

   NOTE: If your system does not detect a recovery partition, it prompts you to insert recovery media that you have created. Insert the first disc or the USB flash drive, select **Yes**, and then click **Next** to restart the computer. If you are using discs, insert the next disc when prompted.

7. When the computer restarts, you will see the Recovery Manager welcome screen again. Under **I need help immediately**, click **System Recovery**. If you are prompted to back up your files, and you have not done so, select **Back up your files first (recommended)**, and then click **Next**. Otherwise, select **Recover without backing up your files**, and then click **Next**.

8. System Recovery begins. After System Recovery is complete, click **Finish** to restart the computer.

9. When Windows has loaded, shut down the computer, reconnect all peripheral devices, and then turn the computer back on.

System Recovery when Windows is not responding

CAUTION: System Recovery deletes all data and programs you created or installed.

If Windows is not responding, but the computer is working, follow these steps to perform a System Recovery.

1. Turn off the computer. If necessary, press and hold the power button until the computer turns off.

2. Disconnect all peripheral devices from the computer, except the monitor, keyboard, and mouse.

3. Press the power button to turn on the computer.

4. As soon as you see the HP logo screen, repeatedly press the F11 key on your keyboard until the *Windows is Loading Files…* message appears on the screen.

5. Under **I need help immediately**, click **System Recovery**.

6. If you are prompted to back up your files, and you have not done so, select **Back up your files first (recommended)**, and then click **Next**. Otherwise, select **Recover without backing up your files**, and then click **Next**.

7. System Recovery begins. After System Recovery is complete, click **Finish** to restart the computer.

8. When Windows has loaded, shut down the computer, reconnect all peripheral devices, and then turn the computer back on.

System recovery using recovery media

You should create a set of recovery media, either a set of DVDs or a USB flash drive, from the recovery image stored on your hard disk drive. This image contains the operating system and software program files that were originally installed on your computer at the factory. You can create only one set of recovery media for your computer, and the media can be used *only* with this computer. Store the recovery media in a safe place.

NOTE: Some features might not be available on systems that are shipped without a Windows operating system.

- To create recovery discs, your computer must have a DVD writer, and you must use only high-quality blank DVD+R or DVD-R discs.

  NOTE: You *cannot* use DVD+RW, DVD-RW, DVD+RW DL, DVD-RW DL, DVD+R DL, or DVD-R DL discs to create recovery discs.

- You have the option of creating a recovery USB flash drive instead, using a high-quality USB drive.

- If you are creating recovery discs, be sure to use high-quality discs. It is normal for the system to reject defective discs. You will be prompted to insert a new blank disc to try again.
- The number of discs in the recovery-disc set depends on your computer model (typically 3 to 6 DVDs). The Recovery Media Creation program tells you the specific number of blank discs needed to make the set. If you are using a USB flash drive, the program will tell you the size of the drive required to store all the data (minimum of 8 GB).

NOTE: The process of creating recovery media is lengthy. You can quit the process at any time. The next time you initiate the process, it resumes where it left off.

Creating recovery media

To create recovery discs:

1. Close all open programs.
2. Click the **Start** button, click **All Programs**, click **Security and Protection**, and then click **HP Recovery Media Creation**. If prompted, click **Yes** to allow the program to continue.
3. Click **Create recovery media using blank DVD(s)**, and then click **Next**.
4. Follow the on-screen instructions. Label each disc as you make it (for example, Recovery 1, Recovery 2), and then store the discs in a secure place.

To create a recovery USB flash drive:

NOTE: You must use a flash drive with a capacity of at least 8 GB.

1. Close all open programs.
2. Insert the USB flash drive into a USB port on the computer.
3. Click the **Start** button, click **All Programs**, click **Security and Protection**, and then click **Recovery Media Creation**.
4. Click **Create recovery media with a USB flash drive**, and then click **Next**.
5. Select the USB flash drive from the list of media. The program will let you know how much storage is required to create the recovery drive. If the USB flash drive does not have enough storage capacity, it will appear grayed out, and you must replace it with a larger USB flash drive. Click **Next**.

NOTE: Recovery Media Creation formats the flash drive, deleting any files on it.

6. Follow the on-screen instructions. When the process is complete, label the USB flash drive and store it in a secure place.

NOTE: Do not use media cards for creating recovery media. The system may not be able to boot up from a media card and you may not be able to run system recovery.

Using recovery media

⚠ **CAUTION:** System Recovery deletes all data and programs you have created or installed. Back up any important data to a CD or DVD or to a USB flash drive.

To create recovery media, see System recovery using recovery media on page 158.

To perform a System Recovery using recovery media:

1. If using a set of DVDs, insert the first recovery disc into the DVD drive tray, and close the tray. If you are using a recovery USB flash drive, insert it into a USB port.
2. If the computer is not responding, press and hold the power button for approximately 5 seconds or until the computer turns off.

   or

   Click the **Start** button, and then click **Shut Down**.
3. Disconnect all peripheral devices from the computer except the monitor, keyboard, and mouse.
4. Press the power button to turn on the computer.
5. Press Esc as the computer is powering on to see the startup menu. Use the arrow keys to select the boot menu and press Enter. Use the arrow keys to select the location where the recovery media is inserted (USB or DVD). Press Enter to boot from that device.
6. If Recovery Manager asks if you want to run System Recovery from Media or Hard Drive, select **Media**. On the Welcome screen, under **I need help immediately**, click **Factory Reset**.
7. If you are prompted to back up your files, and you have not done so, select **Back up your files first (recommended)**, and then click **Next**. Otherwise, select **Recover without backing up your files**, and then click **Next**.
8. If you are prompted to insert the next recovery disc, do so.
9. When Recovery Manager is finished, remove the recovery disc or the recovery USB flash drive from the system.
10. Click **Finish** to restart the computer.

Backup and recovery in Windows 8

To protect your information, use Windows Backup and Restore to back up individual files and folders, back up your entire hard drive, create system repair media, or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.

From the Start screen, type `restore`, click **Settings**, and then select from the list of displayed options.

NOTE: For detailed instructions on various backup and restore options, perform a search for these topics in Help and Support. From the Start screen, type `h`, and then select **Help and Support**.

In case of system instability, HP recommends that you print the recovery procedures and save them for later use.

NOTE: Windows includes the User Account Control feature to improve the security of your computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. Refer to Help and Support for more information. From the Start screen, type `h`, and then select **Help and Support**.

Backing up your information

Recovery after a system failure is as good as your most recent backup. You should create system repair media and your initial backup immediately after initial system setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup. The system repair media is used to start up (boot) the computer and repair the operating system in case of system instability or failure. Your initial and subsequent backups allow you to restore your data and settings if a failure occurs.

Type `backup` on the Start screen, click **Settings**, and then select **Save backup copies of your files with File History**.

You can back up your information to an optional external hard drive, or a network drive.

Note the following when backing up:

- Store personal files in the Documents library, and back it up regularly.
- Back up templates that are stored in their associated programs.
- Save customized settings that appear in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to reset your preferences.

To create a backup using Backup and Restore:

NOTE: Be sure that the computer is connected to AC power before you start the backup process.

NOTE: The backup process may take over an hour, depending on file size and the speed of the computer.

1. From the Start screen, type `backup`, click **Settings**, and then select from the list of displayed options.
2. Follow the on-screen instructions to set up your backup, create a system image, or create system repair media.

Performing a system recovery

In case of system failure or instability, the computer provides the following tools to recover your files:

- Windows recovery tools: You can use Windows Backup and Restore to recover information you have previously backed up. You can also use Windows Automatic Repair to fix problems that might prevent Windows from starting correctly.
- f11 recovery tools: You can use the f11 recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.

NOTE: If you are unable to boot (start up) your computer and you cannot use the system repair media you previously created, you must purchase Windows 8 operating system media to reboot the computer and repair the operating system. For additional information, see Using Windows 8 operating system media (purchased separately) on page 163.

Using the Windows recovery tools

To recover information you previously backed up:

▲ From the Start screen, type h, and then select **Help and Support**.

To recover your information using Automatic Repair, follow these steps:

CAUTION: Some Automatic Repair options will completely erase and reformat the hard drive. For additional information go to Help and Support. From the Start screen, type h, and then select **Help and Support**.

1. If possible, back up all personal files.
2. If possible, check for the presence of the HP Recovery partition and the Windows partition:

   From the Start screen, type e, and then click **Windows Explorer**.

   – or –

   From the Start screen, type c, and then select **Computer**.

   NOTE: If the Windows partition and the HP Recovery partition are not listed, you must recover your operating system and programs using the Windows 8 operating system media and the *Driver Recovery* media (both purchased separately). For additional information, see Using Windows 8 operating system media (purchased separately) on page 163.

3. If the Windows partition and the HP Recovery partition are listed, restart the computer after Windows has loaded, and then press and hold Shift while clicking **Restart**.

   NOTE: If the computer fails to boot to Windows after several attempts, the system will boot to the Windows Recovery Environment by default.

4. Select **Troubleshoot**, select **Advanced Options**, and then select **Automatic Repair**.
5. Follow the on-screen instructions.

NOTE: For additional information on recovering information using the Windows tools, perform a search for these topics in Help and Support. From the Start screen, type h, and then select **Help and Support**.

Using f11 recovery tools

CAUTION: Using f11 completely erases hard drive contents and reformats the hard drive. All files that you have created and any software that you have installed on the computer are permanently removed. The f11 recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled.

To recover the original hard drive image using f11:

1. If possible, back up all personal files.
2. If possible, check for the presence of the HP Recovery partition: From the Start screen, type c, and then select **Computer**.

   NOTE: If the HP Recovery partition is not listed, you must recover your operating system and programs using the Windows 8 operating system media, and the *Driver Recovery* media (both purchased separately). For additional information, see Using Windows 8 operating system media (purchased separately) on page 163.
3. If the HP Recovery partition is listed, restart the computer, and then press esc while the company logo is displayed. The computer Startup Menu displays.
4. Press f11 to select the System Recovery option.
5. Follow the on-screen instructions.

Using Windows 8 operating system media (purchased separately)

To order Windows 8 operating system media, go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions. You can also order the media by calling support.

CAUTION: Using Windows 8 operating system media completely erases hard drive contents and reformats the hard drive. All files that you have created and any software that you have installed on the computer are permanently removed. When reformatting is complete, the recovery process helps you restore the operating system, as well as drivers, software, and utilities.

To initiate recovery using Windows 8 operating system media:

NOTE: This process takes several minutes.

1. If possible, back up all personal files.
2. Restart the computer, and then follow the instructions provided with the Windows 8 operating system media to install the operating system.
3. When prompted, press any keyboard key.
4. Follow the on-screen instructions.

After the repair is completed:

1. Remove the Windows 8 operating system media, and then insert the *Driver Recovery* media.
2. Install the Hardware Enabling Drivers first, and then install Recommended Applications.

10 POST Error Messages

This appendix lists the error codes, error messages, and the various indicator light and audible sequences that you may encounter during Power-On Self-Test (POST) or computer restart, the probable source of the problem, and steps you can take to resolve the error condition.

POST Message Disabled suppresses most system messages during POST, such as memory count and non-error text messages. If a POST error occurs, the screen will display the error message. To manually switch to the POST Messages Enabled mode during POST, press any key (except F10, F11, or F12). The default mode is POST Message Disabled.

The speed at which the computer loads the operating system and the extent to which it is tested are determined by the POST mode selection.

Full Boot may also be enabled to run every 1 to 30 days on a regularly scheduled basis. To establish the schedule, reconfigure the computer to the Full Boot Every x Days mode, using Computer Setup.

POST Numeric Codes and Text Messages

This section covers those POST errors that have numeric codes associated with them. The section also includes some text messages that may be encountered during POST.

NOTE: The computer will beep once after a POST text message is displayed on the screen.

Table 10-1 Numeric Codes and Text Messages

Control panel message	Description	Recommended action
101-Option ROM Checksum Error	System ROM checksum.	1. Verify the correct ROM. 2. Flash the ROM if needed. 3. Clear CMOS. (See Appendix B, Password Security and Resetting CMOS on page 176.) 4. Replace the system board.
103-System Board Failure	DMA or timers.	1. Clear CMOS. (See Appendix B, Password Security and Resetting CMOS on page 176.) 2. Replace the system board.
162-System Options Not Set	Configuration incorrect. RTC (real-time clock) battery may need to be replaced.	Run Computer Setup and check the configuration in **Advanced** > **Onboard Devices**. Reset the date and time under **Control Panel**. If the problem persists, replace the RTC battery. See the Removal and Replacement section for instructions on installing a new battery, or contact an authorized dealer or reseller for RTC battery replacement.
163-Time & Date Not Set	Invalid time or date in configuration memory. RTC (real-time clock) battery may need to be replaced.	Reset the date and time under **Control Panel** (Computer Setup can also be used). If the problem persists, replace the RTC battery. See the Removal and Replacement section for instructions on installing a new battery, or contact an authorized dealer or reseller for RTC battery replacement.
163-Time & Date Not Set	CMOS jumper may not be properly installed.	Check for proper placement of the CMOS jumper if applicable.
164-MemorySize Error	Memory amount has changed since the last boot (memory added or removed).	Press the F1 key to save the memory changes.
164-MemorySize Error	Memory configuration incorrect.	1. Run Computer Setup or Windows utilities. 2. Make sure the memory module(s) are installed properly. 3. If third-party memory has been added, test using HP-only memory. 4. Verify proper memory module type.

Table 10-1 Numeric Codes and Text Messages (continued)

Control panel message	Description	Recommended action
201-Memory Error	RAM failure.	1. Ensure memory modules are correctly installed. 2. Verify proper memory module type. 3. Remove and replace the identified faulty memory module(s). 4. If the error persists after replacing memory modules, replace the system board.
213-Incompatible Memory Module in Memory Socket(s) X, X, ...	A memory module in memory socket identified in the error message is missing critical SPD information, or is incompatible with the chipset.	1. Verify proper memory module type. 2. Try another memory socket. 3. Replace DIMM with a module conforming to the SPD standard.
214-DIMM Configuration Warning	Populated DIMM Configuration is not optimized.	Rearrange the DIMMs so that each channel has the same amount of memory.
219-ECC Memory Module Detected ECC Modules not supported on this Platform	Recently added memory module(s) support ECC memory error correction.	1. If additional memory was recently added, remove it to see if the problem remains. 2. Check product documentation for memory support information.
301-Keyboard Error	Keyboard failure.	1. Reconnect keyboard with computer turned off. 2. Check connector for bent or missing pins. 3. Ensure that none of the keys are depressed. 4. Replace keyboard.
303-Keyboard Controller Error	I/O board keyboard controller.	1. Reconnect keyboard with computer turned off. 2. Replace the system board.
304-Keyboard or System Unit Error	Keyboard failure.	1. Reconnect the keyboard with computer turned off. 2. Ensure that none of the keys are depressed. 3. Replace the keyboard. 4. Replace the system board.

Table 10-1 Numeric Codes and Text Messages (continued)

Control panel message	Description	Recommended action
501-Display Adapter Failure	Graphics display controller.	1. Reseat the graphics card (if applicable). 2. Clear CMOS. (See Appendix B, Password Security and Resetting CMOS on page 176.) 3. Verify monitor is attached and turned on. 4. Replace the graphics card (if possible).
510-Flash Screen Image Corrupted	Flash Screen image has errors.	Reflash the system ROM with the latest BIOS image.
511-CPU, CPUA, or CPUB Fan not Detected	CPU fan is not connected or may have malfunctioned.	1. Reseat CPU fan. 2. Reseat fan cable. 3. Replace CPU fan.
512-Chassis, Rear Chassis, or Front Chassis Fan not Detected	Chassis, rear chassis, or front chassis fan is not connected or may have malfunctioned.	1. Reseat chassis, rear chassis, or front chassis fan. 2. Reseat fan cable. 3. Replace chassis, rear chassis, or front chassis fan.
513-Front Chassis fan not detected	Front chassis fan is not connected or may have malfunctioned.	1. Reseat front chassis fan. 2. Reseat fan cable. 3. Replace front chassis fan.
514-CPU or Chassis Fan not Detected	CPU or chassis fan is not connected or may have malfunctioned.	1. Reseat CPU or chassis fan. 2. Reseat fan cable. 3. Replace CPU or chassis fan.
515-Power Supply fan not detected	Power supply fan is not connected or may have malfunctioned.	1. Reseat power supply fan. 2. Reseat fan cable. 3. Replace power supply fan.
660-Display cache is detected unreliable	Integrated graphics controller display cache is not working properly and will be disabled.	Replace system board if minimal graphics degrading is an issue.
912-Computer Cover Has Been Removed Since Last System Startup	Computer cover was removed since last system startup.	No action required.
917-Front Audio Not Connected	Front audio connector has been detached or unseated from motherboard.	Reconnect or replace front audio cable.
918-Front USB Not Connected	Front USB harness has been detached or unseated from motherboard.	Reconnect or replace front USB harness.

Table 10-1 Numeric Codes and Text Messages (continued)

Control panel message	Description	Recommended action
1151-Serial Port A Address Conflict Detected	Both external and internal serial ports are assigned to COM1.	1. Clear CMOS. (See Appendix B, Password Security and Resetting CMOS on page 176.) 2. Reconfigure card resources and/or run Computer Setup or Windows utilities.
1152-Serial Port B Address Conflict Detected	Both external and internal serial ports are assigned to COM2.	1. Clear CMOS. (See Appendix B, Password Security and Resetting CMOS on page 176.) 2. Reconfigure card resources and/or run Computer Setup or Windows utilities.
1155-Serial Port Address Conflict Detected	Both external and internal serial ports are assigned to same IRQ.	1. Clear CMOS. (See Appendix B, Password Security and Resetting CMOS on page 176.) 2. Reconfigure card resources and/or run Computer Setup or Windows utilities.
1720-SMART Hard Drive Detects Imminent Failure	Hard drive is about to fail. (Some hard drives have a hard drive firmware patch that will fix an erroneous error message.)	1. Determine if hard drive is giving correct error message. Enter Computer Setup and run the Drive Protection System test under **Storage** > **DPS Self-test**. 2. Apply hard drive firmware patch if applicable. (Available at http://www.hp.com/support.) 3. Back up contents and replace hard drive.
1796-SATA Cabling Error	One or more SATA devices are improperly attached. For optimal performance, the SATA 0 and SATA 1 connectors must be used before SATA 2.	Ensure SATA connectors are used in ascending order. For one device, use SATA 0. For two devices, use SATA 0 and SATA 1. For three devices, use SATA 0, SATA 1, and SATA 2.
1797-SATA Drivelock is not supported in RAID mode.	Drivelock is enabled on one or more SATA hard drives, and they cannot be accessed while the system is configured for RAID mode.	Either remove the Drivelocked SATA device or disable the Drivelock feature. To disable the Drivelock feature, enter Computer Setup, change **Storage** > **Storage Options** > **SATA Emulation** to **IDE**, and select **File** > **Save Changes and Exit**. Reenter Computer Setup and select **Security** > **Drivelock Security**. For each listed Drivelock-capable SATA device, ensure Drivelock is **Disabled**. Lastly, change **Storage** > **Storage Options** > **SATA Emulation** back to **RAID** and select **File** > **Save Changes and Exit**.
1801-Microcode Patch Error	Processor is not supported by ROM BIOS.	1. Upgrade BIOS to proper version. 2. Change the processor.

Table 10-1 Numeric Codes and Text Messages (continued)

Control panel message	Description	Recommended action
2200-PMM Allocation Error during MEBx Download	Memory error during POST execution of the Management Engine (ME) BIOS Extensions option ROM.	1. Reboot the computer. 2. Unplug the power cord, re-seat the memory modules, and reboot the computer. 3. If the memory configuration was recently changed, unplug the computer, restore the original memory configuration, and reboot the computer. 4. If the error persists, replace the system board.
2201-MEBx Module did not checksum correctly	Memory error during POST execution of the Management Engine (ME) BIOS Extensions option ROM.	1. Reboot the computer. 2. Unplug the power cord, re-seat the memory modules, and reboot the computer. 3. If the memory configuration was recently changed, unplug the power cord, restore the original memory configuration, and reboot the computer. 4. If the error persists, replace the system board.
2202-PMM Deallocation Error during MEBx cleanup	Memory error during POST execution of the Management Engine (ME) BIOS Extensions option ROM.	1. Reboot the computer. 2. Unplug the power cord, re-seat the memory modules, and reboot the computer. 3. If the memory configuration was recently changed, unplug the power cord, restore the original memory configuration, and reboot the computer. 4. If the error persists, replace the system board.
2203-Setup error during MEBx execution	MEBx selection or exit resulted in a setup failure.	1. Reboot the computer. 2. Unplug the power cord, re-seat the memory modules, and reboot the computer. 3. If the memory configuration was recently changed, unplug the power cord, restore the original memory configuration, and reboot the computer. 4. If the error persists, replace the system board.

Table 10-1 Numeric Codes and Text Messages (continued)

Control panel message	Description	Recommended action
2204-Inventory error during MEBx execution	BIOS information passed to the MEBx resulted in a failure.	1. Reboot the computer. 2. If the error persists, update to the latest BIOS version. 3. If the error still persists, replace the system board.
2205-Interface error during MEBx execution	MEBx operation experienced a hardware error during communication with ME.	1. Reboot the computer. 2. If the error persists, update to the latest BIOS version. 3. If the error still persists, replace the system board.
2211-Memory not configured correctly for proper MEBx execution.	DIMM1 or XMM1 is not installed.	Make sure there is a memory module in the black DIMM1 socket and that it is properly seated.
2212-USB Key Provisioning failure writing to device	USB device used for USB key provisioning will not allow BIOS to update provision file properly.	1. Try a different USB key device for provisioning. 2. If the error persists, update to the latest BIOS version and ME firmware version. 3. If the error still persists, replace the system board.
2217-ME Firmware Version request failure	ME firmware is not properly responding to BIOS query for version information.	1. Reboot the computer. 2. If the error persists, update to the latest BIOS version and ME firmware version. 3. If the error still persists, replace the system board.
2218-ME Firmware Version should be updated	ME firmware must be updated to match current functionality contained in the system BIOS.	1. Update to the latest ME firmware version. 2. If the error persists and system BIOS has been recently updated, restore previous system BIOS version. 3. If the error still persists, replace the system board.
2219-USB Key Provisioning file has invalid header identifier	Provisioning file contained on the USB key has been corrupted or is not a valid version for the current ME firmware.	1. Recreate the provisioning file using third party management console software. 2. If the error persists and system BIOS has been recently updated, restore previous system BIOS version. Otherwise, update the ME firmware version. 3. If the error still persists, replace the system board.

Table 10-1 Numeric Codes and Text Messages (continued)

Control panel message	Description	Recommended action
2220-USB Key Provisioning file has mismatch version	Provisioning file contained on the USB key is not a valid version for the current ME firmware.	1. Reboot the computer. 2. If the error persists and system BIOS has been recently updated, restore previous system BIOS version. Otherwise, update the ME firmware version. 3. If the error still persists, replace the system board.
2230-General error during MEBx execution	Error occurred during MEBx execution which fails into the “General” grouping. Status information displayed along with the error provides further clarity into the failure. MEBx handles transference of information between the system BIOS and ME firmware.	1. Reboot the computer. 2. If the error persists, update to the latest BIOS version and ME firmware version. 3. If the error still persists, replace the system board.
2231-ME error during MEBx execution	Error occurred during MEBx execution which fails into “ME” grouping.	1. Reboot the computer. 2. If the error persists, update to the latest BIOS version and ME firmware version. 3. If the error still persists, replace the system board.
2232-AMT error during MEBx execution	Error occurred during MEBx execution which fails into “AMT” grouping.	1. Reboot the computer. 2. If the error persists, update to the latest BIOS version and ME firmware version. 3. If the error still persists, replace the system board.
2233-HECI error during MEBx execution	Error occurred during MEBx execution which fails into “MEI or HECI” grouping.	1. Reboot the computer. 2. If the error persists, update to the latest BIOS version and ME firmware version. 3. If the error still persists, replace the system board.
2239-ME image lock failure	Special system configurations with reduced ME firmware image require BIOS control of ME firmware upgrading. A failure has occurred after the ME firmware update process in which the BIOS could not relock the ME firmware region.	1. Reboot the computer. 2. If the error persists, update to the latest BIOS version and ME firmware version. 3. If the error still persists, replace the system board.
2240-ME image unlock failure	Special system configurations with reduced ME firmware image require BIOS control of ME firmware upgrading. A failure has occurred prior to the ME firmware update process in which the BIOS could not unlock the ME firmware region.	1. Reboot the computer. 2. If the error persists, update to the latest BIOS version and ME firmware version. 3. If the error still persists, replace the system board.

Table 10-1 Numeric Codes and Text Messages (continued)

Control panel message	Description	Recommended action
Invalid Electronic Serial Number	Electronic serial number is missing.	Enter the correct serial number in Computer Setup.
Network Server Mode Active and No Keyboard Attached	Keyboard failure while Network Server Mode enabled.	1. Reconnect keyboard with computer turned off. 2. Check connector for bent or missing pins. 3. Ensure that none of the keys are depressed. 4. Replace keyboard.
Parity Check 2	Parity RAM failure.	Run Computer Setup and Diagnostic utilities.

Interpreting POST diagnostic front panel LEDs

This section covers the front panel LED codes as well as the audible codes that may occur before or during POST that do not necessarily have an error code or text message associated with them.

WARNING! When the computer is plugged into an AC power source, voltage is always applied to the system board. To reduce the risk of personal injury from electrical shock and/or hot surfaces, be sure to disconnect the power cord from the wall outlet and allow the internal system components to cool before touching.

NOTE: If you see flashing LEDs on a PS/2 keyboard, look for flashing LEDs on the front panel of the computer and refer to the following table to determine the front panel LED codes.

Recommended actions in the following table are listed in the order in which they should be performed.

Not all diagnostic lights and audible codes are available on all models.

Table 10-2 Diagnostic front panel LEDs and audible codes

Activity	Beeps	Possible Cause	Recommended Action
Green Power LED On.	None	Computer on.	None
Green Power LED flashes every two seconds.	None	Computer in Suspend to RAM mode (some models only) or normal Suspend mode.	None required. Press any key or move the mouse to wake the computer.
Red Power LED flashes two times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	2	Processor thermal protection activated: A fan may be blocked or not turning. OR The heat sink/fan assembly is not properly attached to the processor.	1. Ensure that the computer air vents are not blocked and the processor cooling fan is running. 2. Open hood, press power button, and see if the processor fan spins. If the processor fan is not spinning, make sure the fan's cable is plugged onto the system board header. 3. If fan is plugged in, but is not spinning, then replace heat sink/fan assembly. 4. Contact an authorized reseller or service provider.
Red Power LED flashes three times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	3	Processor not installed (not an indicator of bad processor).	1. Check to see that the processor is present. 2. Reseat the processor.

Table 10-2 Diagnostic front panel LEDs and audible codes (continued)

Activity	Beeps	Possible Cause	Recommended Action
Red Power LED flashes four times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	4	Power failure (power supply is overloaded).	1. Open the hood and ensure the 4 or 6-wire power supply cable is seated into the connector on the system board. 2. Check if a device is causing the problem by removing ALL attached devices. Power on the system. If the system enters the POST, then power off and replace one device at a time and repeat this procedure until failure occurs. Replace the device that is causing the failure. Continue adding devices one at a time to ensure all devices are functioning properly. 3. Replace the power supply. 4. Replace the system board.
Red Power LED flashes five times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	5	Pre-video memory error.	**CAUTION:** To avoid damage to the DIMMs or the system board, you must unplug the computer power cord before attempting to reseat, install, or remove a DIMM module. 1. Reseat DIMMs. 2. Replace DIMMs one at a time to isolate the faulty module. 3. Replace third-party memory with HP memory. 4. Replace the system board.
Red Power LED flashes six times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	6	Pre-video graphics error.	For systems with a graphics card: 1. Reseat the graphics card. 2. Replace the graphics card. 3. Replace the system board. For systems with integrated graphics, replace the system board.
Red Power LED flashes seven times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	7	System board failure (ROM detected failure prior to video).	Replace the system board.
Red Power LED flashes eight times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	8	Invalid ROM based on bad checksum.	1. Reflash the system ROM with the latest BIOS image. See the “Boot Block Emergency Recovery Mode” section of the *Desktop Management Guide* for more information. 2. Replace the system board.

Table 10-2 Diagnostic front panel LEDs and audible codes (continued)

Activity	Beeps	Possible Cause	Recommended Action
Red Power LED flashes nine times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	9	System powers on but is unable to boot.	1. Unplug the AC power cord from the computer, wait 30 seconds, then plug the power cord back in to the computer. 2. Replace the system board. 3. Replace the processor.
Red Power LED flashes eleven times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	11	The current processor does not support a feature previously enabled on this system.	1. Install a TXT capable processor. 2. Disable TXT in the Computer Setup (F10) utility. 3. Reinstall the original processor.
Red Power LED flashes eleven times, once every second, followed by a two second pause. Beeps stop after fifth iteration but LEDs continue until problem is solved.	12	MXM thermal shutdown.	1. Clean the MXM graphics card heat sink. 2. Replace the MXM graphics card heat sink. 3. Replace the MXM graphic card.
System does not power on and LEDs are not flashing.	None	System unable to power on.	Press and hold the power button for less than 4 seconds. If the hard drive LED turns green, the power button is working correctly. Try the following: 1. Replace the system board. OR Press and hold the power button for less than 4 seconds. If the hard drive LED does not turn on green then: 1. Check that the unit is plugged into a working AC outlet. 2. Open rear cover and check that the power button cable is properly connected to the system board. 3. Check to see if the 5V_aux light on the system board is turned on. If it is turned on, then replace the power button board and cable. If the problem persists, replace the system board. 4. Replace the AC adapter.

11 Password Security and Resetting CMOS

This computer supports security password features, which can be established through the Computer Setup Utilities menu.

This computer supports two security password features that are established through the Computer Setup Utilities menu: setup password and power-on password. When you establish only a setup password, any user can access all the information on the computer except Computer Setup. When you establish only a power-on password, the power-on password is required to access Computer Setup and any other information on the computer. When you establish both passwords, only the setup password will give you access to Computer Setup.

When both passwords are set, the setup password can also be used in place of the power-on password as an override to log in to the computer. This is a useful feature for a network administrator.

If you forget the password for the computer, you can clear that password so you can gain access to the information on the computer by resetting the password jumper.

⚠ **CAUTION:** Pushing the CMOS button will reset CMOS values to factory defaults. It is important to back up the computer CMOS settings before resetting them in case they are needed later. Back up is easily done through Computer Setup. See Computer Setup (F10) Utility on page 12 for information.

CAUTION: If you enable the stringent security feature in Computer Setup and you forget the setup password or the power-on password, the computer is inaccessible and can no longer be used.

Enabling the stringent password disables the ability to reset the password by moving the jumper on the system board.

If you lose or forget the password, the system board must be replaced. This scenario is not covered under warranty.

To prevent the computer from becoming permanently unusable, record your configured setup password or power-on password in a safe place away from your computer. Without these passwords, the computer cannot be unlocked.

Establishing a Setup or Power-on password

To establish the power-on or setup password features, complete the following steps:

1. Turn on or restart the computer.
2. As soon as the computer turns on, press the Esc key while “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
3. Press the F10 key to enter Computer Setup.
4. To establish Setup password, select **Security > Setup Password** and follow the instructions.

   – or –

   To establish a Power-On password, select **Security > Power-On Password** and follow the instructions on the screen
5. Before exiting, click **File > Save Changes and Exit**.

Resetting the Setup and Power-on password

To disable the power-on or setup password features, or to clear the power-on or setup passwords, complete the following steps:

1. Shut down the operating system properly, then turn off the computer and any external devices, and disconnect the power cord from the power outlet.
2. With the power cord disconnected, press the power button again to drain the system of any residual power.

WARNING! To reduce the risk of personal injury from electrical shock and/or hot surfaces, be sure to disconnect the power cord from the wall outlet, and allow the internal system components to cool before touching.

CAUTION: When the computer is plugged in, the power supply always has voltage applied to the system board even when the unit is turned off. Failure to disconnect the power cord can result in damage to the system.

Static electricity can damage the electronic components of the computer or optional equipment. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object. See the *Regulatory, Safety and Environmental Notices* guide for more information.

3. Remove the access panel.
4. Locate the header and jumper labeled PSWD.

NOTE: The password jumper is blue so that it can be easily identified. For assistance locating the password jumper and other system board components, see the Illustrated Parts & Service Map (IPSM). The IPSM can be downloaded from http://www.hp.com/support.

5. Remove the jumper.
6. Replace the jumper.
7. Replace the access panel.
8. Reconnect the external equipment.
9. Plug in the computer and turn on power. Allow the operating system to start. This clears the current passwords and disables the password features.
10. Establish the new passwords in Computer Setup. See Computer Setup (F10) Utility on page 12 for information.

Clearing and resetting the CMOS

The computer's configuration memory (CMOS) stores information about the computer's configuration.

The CMOS button resets CMOS but does not clear the power-on and setup passwords.

Clearing CMOS will clear the Active Management Technology (AMT) settings in the Management Engine BIOS Extension (MEBx), including the password. The password will default to "admin" and will need to be reset. The AMT settings will also need to be reset. To access the MEBx, press Ctrl+P during POST.

1. Turn off the computer and any external devices, and disconnect the power cord from the power outlet.
2. Disconnect the keyboard, monitor, and any other external equipment connected to the computer.

WARNING! To reduce the risk of personal injury from electrical shock and/or hot surfaces, be sure to disconnect the power cord from the wall outlet, and allow the internal system components to cool before touching.

CAUTION: When the computer is plugged in, the power supply always has voltage applied to the system board even when the unit is turned off. Failure to disconnect the power cord can result in damage to the system.

Static electricity can damage the electronic components of the computer or optional equipment. Before beginning these procedures, ensure that you are discharged of static electricity by briefly touching a grounded metal object. See the *Safety & Regulatory Information* guide for more information.

3. Remove the computer cover or access panel.

CAUTION: Pushing the CMOS button will reset CMOS values to factory defaults. It is important to back up the computer CMOS settings before resetting them in case they are needed later. Back up is easily done through Computer Setup. See Computer Setup (F10) Utility on page 12 for information on backing up the CMOS settings.

4. Locate, press, and hold the CMOS button in for five seconds.

NOTE: Make sure you have disconnected the AC power cord from the wall outlet. The CMOS button will not clear CMOS if the power cord is connected.

Figure 11-1 CMOS button

NOTE: For assistance locating the CMOS button and other system board components, see the Illustrated Parts & Service Map (IPSM).

5. Replace the computer cover or access panel.
6. Reconnect the external devices.
7. Plug in the computer and turn on power.

NOTE: You will receive POST error messages after clearing CMOS and rebooting advising you that configuration changes have occurred. Use Computer Setup to reset any special system setups along with the date and time.

For instructions on Computer Setup, see Computer Setup (F10) Utility on page 12.

A Power Cord Set Requirements

The power supplies on some computers have external power switches. The voltage select switch feature on the computer permits it to operate from any line voltage between 100-120 or 220-240 volts AC. Power supplies on those computers that do not have external power switches are equipped with internal switches that sense the incoming voltage and automatically switch to the proper voltage.

The power cord set received with the computer meets the requirements for use in the country where you purchased the equipment.

Power cord sets for use in other countries must meet the requirements of the country where you use the computer.

General requirements

The requirements listed below are applicable to all countries:

1. The power cord must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be installed.
2. The power cord set must have a minimum current capacity of 10A (7A Japan only) and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.
3. The diameter of the wire must be a minimum of 0.75 mm_2 or 18AWG, and the length of the cord must be between 1.8 m (6 feet) and 3.6 m (12 feet).

The power cord should be routed so that it is not likely to be walked on or pinched by items placed upon it or against it. Particular attention should be paid to the plug, electrical outlet, and the point where the cord exits from the product.

⚠ **WARNING!** Do not operate this product with a damaged power cord set. If the power cord set is damaged in any manner, replace it immediately.

Japanese Power Cord Requirements

For use in Japan, use only the power cord received with this product.

⚠ **CAUTION:** Do not use the power cord received with this product on any other products.

Country-specific requirements

Additional requirements specific to a country are shown in parentheses and explained below.

Country	Accrediting Agency	Country	Accrediting Agency
Australia (1)	EANSW	Italy (1)	IMQ
Austria (1)	OVE	Japan (3)	METI
Belgium (1)	CEBC	Norway (1)	NEMKO
Canada (2)	CSA	Sweden (1)	SEMKO
Denmark (1)	DEMKO	Switzerland (1)	SEV
Finland (1)	SETI	United Kingdom (1)	BSI
France (1)	UTE	United States (2)	UL
Germany (1)	VDE		

1. The flexible cord must be Type HO5VV-F, 3-conductor, 0.75mm_2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where it will be used.
2. The flexible cord must be Type SVT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15A, 125V) or NEMA 6-15P (15A, 250V) configuration.
3. Appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. Flexible cord must be Type VCT or VCTF, 3-conductor, 0.75 mm_2 conductor size. Wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7A, 125V) configuration.

B Specifications

8300 models

Table B-1 Specifications

Dimensions (with stand)		
Height	17.2 in	43.6 cm
Width	22.1 in	56.2 cm
Depth	7.7 in	19.6 cm
Approximate Weight (with stand)	21.7 lb – 25.5 lbs	9.85 kg – 11.55 kg
Temperature Range		
Operating	50° to 95°F	10° to 35°C
Nonoperating	-22° to 140°F	-30° to 60°C
Relative Humidity (non-condensing)		
Operating	10-90% at ambient	10-90% at ambient
Non-operating	5-95% at ambient	5-95% at ambient
Maximum Altitude (unpressurized)		
Operating	0 - 10,000 ft	0 - 3,048 m
Non-operating	0 - 30,000 ft	9,144 m
Power Supply		
Rated Voltage Range	100-240 V	
Rated Line Frequency	50-60 Hz	
Max Operating Power	230 W	

6300 models

Table B-2 Specifications

Dimensions (with stand)		
Height	16.8 in	42.6 cm
Width	20.5 in	52.2 cm
Depth	7.7 in	19.6 cm
Approximate Weight (with stand)	19.5 lb – 22.2 lbs	8.83 kg – 10.08 kg
Temperature Range		
Operating	50° to 95°F	10° to 35°C
Nonoperating	-22° to 140°F	-30° to 60°C
Relative Humidity (non-condensing)		
Operating	10-90% at ambient	10-90% at ambient
Non-operating	5-95% at ambient	5-95% at ambient
Maximum Altitude (unpressurized)		
Operating	0 - 10,000 ft	0 - 3,048 m
Non-operating	0 - 30,000 ft	9,144 m
Power Supply		
Rated Voltage Range	100-240 V	
Rated Line Frequency	50-60 Hz	
Max Operating Power	180 W	

Index

A

access panel
  removing 42
access panel, locked 119
antenna
  removing 103
audible codes 173
audio problems 134

B

Backup and Restore 161
battery
  disposal 37
battery replacement 59
booting options
  Full Boot 164

C

cable management cover 39
cable pinouts
  SATA data 29
card reader board
  removing 95
cautions
  AC power 31
  cables 37
  electrostatic discharge 32
  keyboard cleaning 35
  keyboard keys 36
CD-ROM or DVD problems 147
cleaning
  computer 35
  mouse 36
  safety precautions 35
CMOS
  backing up 176
  clearing and resetting 179
components
  front 3
  rear 5
  side 4
computer cleaning 35
converter board
  removing 66
country power cord set
  requirements 182
Customer Support 115, 155

D

display panel
  removing 105

E

electrostatic discharge (ESD) 32
  preventing damage 32
error
  codes 164, 173
  messages 165

F

f11 recovery 163
fan
  removing 83
features
  overview 1
flash drive problems 149
flashing LEDs 173
front bezel
  removing 100
front components 3
front panel problems 151

G

general problems 118
graphics board
  removing 80
grounding methods 33

H

hard disc drive, replacing 49
hard drive
  proper handling 37
  SATA characteristics 29
hard drive connector
  removing 113
hard drive problems 124
hard drive recovery 163
hardware installation problems 140
heat sink
  removing 71
height adjustment 7
helpful hints 116
hood sensor
  removing 111

I

installing
  2.5-inch drive, single 49
  3.5-inch hard disc drive 49
  access panel security screw 40
  battery 59
  optical disc drive 53
Internet access problems 151

K

keyboard
  cleaning 35
  synchronizing wireless 40
keyboard problems 138

L

LEDs
  blinking power 173
  blinking PS/2 keyboard 173

lower panel
removing 46

M
Media Card Reader problems 127
memory module
removing 56
memory problems 145
metal plate
removing 47
monitor problems 129
mouse
cleaning 36
synchronizing wireless 40
mouse problems 138
mSATA SSD
removing 76

N
network problems 142
numeric error codes 165

O
opening the computer 38
operating guidelines 34
optical disc drive
replacing 53
optical drive connector
removing 113
optical drive problems 147
overheating, prevention 34

P
password
clearing 176
power-on 176
setup 176
POST error messages 164
power cord set requirements
country specific 182
power problems 122
power supply 183, 184
removing 86
power-on password 176
printer problems 136
problems
audio 134
CD-ROM or DVD 147
flash drive 149
front panel 151
general 118
hard drive 124
hardware installation 140
Internet access 151
keyboard 138
Media Card Reader 127
memory 145
monitor 129
mouse 138
network 142
power 122
printer 136
processor 147
software 153
processor problems 147

R
rear components 5
rear port cover
removing 39
recovery partition 163
removal and replacement procedures
access panel 42
All-in One chassis 38
antenna 103
card reader board 95
converter board 66
display panel 105
fan 83
front bezel 100
graphics board 80
hard drive connector 113
heat sink 71
hood sensor 111
lower panel 46
memory 56
metal plate 47
mSATA SSD 76
optical drive connector 113
power button board 97
power supply 86
preparing to disassemble the computer 38
serial port 61
side panels 84
speakers 82
stand 44
system board 89
thermal module 71
touch sensor board 69
webcam module 63
WLAN module 77
removing battery 59
resetting
CMOS 176
password jumper 176
restoring the hard drive 163
rotation 7

S
safety and comfort 115
safety precautions
cleaning 35
SATA
connectors on system board 29
data cable pinouts 29
hard drive characteristics 29
screws, correct size 36
security
access panel security screw location 40
serial port
removing 61
service considerations 36
setup password 176
side components 4
side panels
removing 84
software
problems 153
servicing computer 36
spare part number
tamper-resistent wrench 36
Torx T-15 screwdriver 36
speakers
removing 82
specifications
computer 183
stand
removing 44
static electricity 32
swivel adjustment 6
synchronizing wireless keyboard and mouse 40
system board
removing 89
SATA connectors 29

T
tamper-proof screws
tool 36
temperature control 34
thermal module
removing 71
tilt adjustment 6
tools, servicing 36
Torx T15 screwdriver 36
touch sensor board
removing 69

V
ventilation, proper 34

W
Wake-on-LAN feature 142
webcam module
removing 63
Windows 8 operating system
DVD 163
WLAN module
removing 77